AN

INDIAN EPHEMERIS

A.D. 700 TO A.D. 1799

SHOWING

THE DAILY SOLAR AND LUNAR RECKONING ACCORDING TO THE PRINCIPAL SYSTEMS CURRENT IN INDIA WITH THEIR ENGLISH EQUIVALENTS

ALSO

THE ENDING MOMENTS OF TITHIS AND NAKSHATRAS

AND

THE YEARS IN DIFFERENT ERAS, A.D., HIJRA, ŚAKA, VIKRAMA, KALIYUGA, KOLLAM, ETC., WITH A PERPETUAL PLANETARY ALMANAC AND OTHER AUXILIARY TABLES

BY

L. D. SWAMIKANNU PILLAI, DIWAN BAHADUR, I.S.O.

M.A., B.L. (MADRAS), LL.B. (LONDON), FELLOW OF THE UNIVERSITY OF MADRAS, AUTHOR OF "INDIAN CHRONOLOGY"

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GENERAL PRINCIPLES AND TABLES

A revised and enlarged edition of "Indian Chronology, 1911."

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PREFACE.

THE "Indian Ephemeris, A.D. 700—A.D. 2000," in eight * volumes, of which the first seven (A.D. 700—A.D. 1799) are now presented to the public, the last and eighth volume (A.D. 1800—A.D. 2000) having been published, by anticipation in 1915, is the outcome of the principles and methods expounded in the author's *Indian Chronology* (1911) for the computation of eras, tithis, nakshatras, etc. These principles and methods are re-stated, for convenience of reference, in the first volume of this work, which is practically a revised and enlarged edition of *Indian Chronology*, and is being separately published as such.

2. Its object is to show, for one thousand three hundred years, i.e., from 1st January A.D. 700 to 31st December A.D. 1999, (1) the eras in use at present in different parts of India, Śaka, Vikrama, Kaliyuga, Kollam, Bengal San, Northern and Southern Cyclic years, Hijra and A.D.; (2) the solar month and day of the Tamil and Malayālam calendars; (3) the solar months according to the *rāśis* or constellations of the zodiac; (4) the tithi for each day with its ending moment to two places of decimals, equivalent to half ghaṭikas; and (5) the nakshatra, with its ending moment; (6) the lunar months and *pakshas* in use all over India and the neighbouring countries; (7) the Muhammadan months and days of the Muhammadan months; and (8) eclipses, solar and lunar. For every one of these items the English month and day and week-day are given regularly throughout. It also contains a full exposition of a practical and at the same time accurate method of ascertaining the actual as well as the mean position of the planets, Mars, Mercury, Jupiter, Venus and Saturn for any date and at any epoch.

3. The author, having hit upon a method of calculating by a simple process, but accurately, to four places of decimals, all the elements required for the computation of a tithi (i.e., the mean ending moment of each tithi, and the appropriate sun's and moon's equations of the centre) as well as all the elements required for nakshatras (i.e., the mean ending moment of each nakshatra and the appropriate moon's equation of the centre) successively for each day, for any number of years, past or future, offered to the Government of Madras to produce (1) an ephemeris in the present form for the whole of the period for which such information would ordinarily be required by epigraphists, i.e., from A.D. 700 to A.D. 1799, and (2) an ephemeris from A.D. 1800 to A.D. 2000 for current use in Government offices. Government accepted both the offers, undertaking to pay part of the cost of compiling the former ephemeris in manuscript and to purchase 1,500 copies of the latter work which was published at the author's expense; they subsequently decided to purchase the copyright of the first edition of the *Ephemeris* A.D. 700 to A.D. 1799, and the present publication is the result of that arrangement. The author tenders his thanks to the Government of Madras for their kind patronage of both parts of the work.

4. It is a result, and at the same time an index, of the unique character of the Indian calendar system, that the only satisfactory solution of the many difficulties

* The work, as originally designed, was to have been issued in seven volumes, including the volume for A.D. 1800 to A.D. 2000; but the addition of the present introductory volume has resulted in the division of Volume I into two parts, of which the first part is the present volume, and the second is the Ephemeris for A.D. 700 to A.D. 799, to which are prefixed (1) an explanation of the process used in the compilation of the Ephemeris, and (2) a set of illustrative dates from South Indian inscriptions. The entire work is therefore actually issued in eight volumes as stated in the text.

presented by it to the historian, the chronologist and the epigraphist, lies in the development of a day to day ephemeris such as is now presented; and any attempt to enable the historian or epigraphist to be his own computer of tithis and nakshatras seems predestined to failure. The historian has not often the aptitude requisite for undertaking such computations: and he has still less often the time necessary for making a number of alternative calculations before selecting the one that rigorously or most nearly satisfies all his data.

5. To the historian, then, of India, this ephemeris, the first of its kind, is dedicated. One wonders why the Hindus, who are so scrupulous as to the computation of the passing moment, should not have thought in the past of maintaining some kind of a continuous ephemeris like the Fasti of Ancient Rome, for verifying the allusions to the lapse of time which are to be met with in literary, and more especially in lithic, records. But history, far from being a favoured pursuit in India, was, until we come to Muhammadan times, almost an avoided subject. It is probably due to this absence of the historical faculty in our ancient men of letters that no expeditious method was ever devised for verifying calendrical details over long periods of time, and that such methods as have come down to us are of the most primitive and tedious description.* An Indian compiler of a panchanga or almanac devotes three months to the preparation of a calendar for the next twelve months and according to this method it would take over twice a hundred years to make a calendar for a thousand years. By a method which is fully explained in pages 2-5 of Part II of Volume I of the present work, the author found it practicable to compile in one day the material required for a ten years' Indian ephemeris: and since the whole of the first or preliminary compilation was effected by means of printed slips, the chances of arithmetical errors affecting the processes of addition and multiplication were also excluded by this method.

6. Few epigraphists will regret the omission from this ephemeris of the *yoga* and *ahas* which are always included in a panchanga; but many may be disposed to question the wisdom of excluding from it the period previous to A.D. 700. The paucity of verifiable Indian dates before the eighth century A.D. was the main consideration in fixing A.D. 700 as the superior limit of the ephemeris. Dr. Fleet found that for the centuries between A.D. 500 and A.D. 800 there were not more than 14 verifiable week-day dates in all the inscriptions discovered in the various parts of India and the neighbouring countries where the Indian calendar has ever been in use. He very properly, therefore, inferred from this circumstance that the week-day must have been introduced into India somewhere about the fifth century A.D. and gradually brought into common use by the eighth century. It is now conjectured by many investigators, including the present writer, that week-days *may* have been known to the Indian peoples some centuries before the fifth century A.D.: but the paucity of actual week-day dates in Indian literature and in Indian inscriptions between the fifth and eighth centuries A.D. is a fact; and it did not seem worth while, for the sake of these few dates, to add two more volumes and the cost of producing them to the bulk and expense of the present publication. The discovery of a new week-day date in any of these early centuries, when the week

* To the same cause is due the singular lack of ability (commented on in Chapter V of Volume I of this work), on the part of literary men with undoubted general information, like the annotator of *Paripādal*, to grasp the historical import of a date referred to by its astronomical details. Likewise it is a mystery why in other cases such annotators, while supplying details sufficient to identify a date, failed to give the date itself. In the body of, and in appendices to, this work, reference is made to three such dates, to be found respectively in Silappadhikāram, Jivakachintāmani and Paripādal.

was as it were on its trial in India, would be so interesting an event that expert attention could not fail to be directed to it. The author has, in the first volume of this work and the tables appended thereto, furnished methods of computing such dates to any desired degree of accuracy according to any one of four siddhāntas, the Sūrya siddhānta, the first Ārya siddhānta, the Brahma siddhānta and the Siddhānta Śiromaṇi.

7. In preparing a second edition of the author's *Indian Chronology* (1911) for the first volume of the present publication, numerous changes were found necessary, some in the direction of simplifying, and others in that of amplifying, that work. Of late years the attention of the public has been drawn to the desirability of occasionally employing Indian systems other than the Sūrya siddhānta in verifying Indian dates. The author has, therefore, now not only amplified his original Sūrya siddhānta Eye-table, but also devised similar eye-tables for the first Ārya siddhānta, the Brahma siddhānta and the Siddhānta Śiromaṇi. For the reason stated on page 77 of Volume I of this work it did not seem necessary to deal specially with the second Ārya siddhānta.

8. Secondly, the investigation of ancient planetary records, called horoscopes, will, it is confidently hoped, be furthered by the large amount of space devoted to the subject in the present work ; in fact, certain aspects of it, such as the planetary eye-tables and the perpetual planetary almanac, are for the first time now presented to the public and at least one problem of first-rate importance in Tamil literary chronology has been successfully solved by their means.

9. Several readers of *Indian Chronology* in its first edition having complained of the absence of a popular and at the same time compendious exposition of the leading principles of the Indian calendar, the author has endeavoured to supply the want by means of Chapter II of Volume I of the present work, "Exposition of the eye-tables" which, with the eye-tables themselves and the illustrative problems prefixed to them, will be found a small but self-contained treatise on the subject.

10. The tables in the first volume of this work have been regrouped for the present edition and reduced in number to six, the most important being Tables II, III, IV and V. The author had entertained an idea that upon the appearance of his ephemeris for A.D. 700 to A.D. 2000, Table II (which was table X in the first edition) could be dispensed with and a considerable amount of space thereby saved : he has since found, however, that for applying the *other* siddhāntas to the computation of tithis, nakshatras and yogas, Table II is indispensable and he has been obliged to retain it accordingly. Eclipses, solar and lunar, are dealt with in Chapter V, section v and in Table IV-L, from a practical point of view, viz., to the extent necessary to enable the student to satisfy himself whether an eclipse was possible or probable on dates anterior to the earliest year for which *Oppolzer's Kanon der Finsternisse* is available, 1207 B.C.

11. Several papers by the author which students of Indian Chronology occasionally ask for, but which hitherto either were not printed or were available only in private circulation, have now been included in the appendix ; and a copious list of South Indian dates, fully verified and arranged in order of dynasties, is prefixed to Part II of Volume I of this work, by way of illustrating the practical use of the Ephemeris in historical investigation. Among papers now printed for the first time is Paper No. (i) appended to Volume I, Part I on the Vedāṅga Jyotisha,

containing the substance of the Sir Subrahmanya Ayyar lectures delivered by the author in 1916 at the request of the Madras University.

12. In the preface to the first edition of *Indian Chronology* (March 1911) the author expressed his obligations to previous writers, particularly to Professor HERMANN JACOBI (of Bonn and Heidelberg), who is unquestionably the greatest authority on the subject. The exact connexion between this work and Professor Jacobi's Tables in *Epigraphia Indica* is brought out in Chapter IV "Construction of Tables." The rules on page 3, paragraph 12, regarding the commencement of the civil solar month in various parts of India were taken from the *Indian Calendar* by Messrs. R. SEWELL and S. B. DIKSHIT; in the present edition the author has also used Dr. Schram's calculations of the śodhya as reproduced in Mr. R. SEWELL's *Indian Chronography*.

MADRAS,
January 1922.

L. D. SWAMIKANNU.

AN INDIAN EPHEMERIS, A.D. 700 TO A.D. 1799.

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AN INDIAN EPHEMERIS
(A.D. 700 TO A.D. 1799)

VOLUME I.—PART I.

CHAPTER I.—PRELIMINARY NOTIONS.

Section i.—*The siddhāntas.*

Every Indian calendar or panchānga follows a particular siddhānta or system of astronomical constants. Varāhamihira, an astronomer of the sixth century A.D., has described five principal siddhāntas in his *Panchasiddhāntikā* (Ed. Thibaut, with English translation), and Dr. J. Burgess, at p. 722 of J.R.A.S. (1893) enumerates eight principal siddhāntas. The siddhāntas which have so far been investigated in detail are, (1) the Sūrya siddhānta, (2) the first Ārya siddhānta, (3) the second Ārya siddhānta, (4) the Brahma siddhānta, and (5) the Siddhānta Śiromani. It is a mistake to suppose that one siddhānta differs from another as the Ptolemaic system differs from the Copernican. On the contrary the basic principles of all the siddhāntas are the same and they differ from one another only in the astronomical constants or lengths of the fundamental periods used in computation. The slight variations among the siddhāntas, which affect the computation of tithis, nakshatras and yogas, are made manifest by means of the different Eye-tables in the present volume, pages 153 to 194 and the footnotes on pages 200 to 279. The following calculations show that in the most important period A.D. 900—A.D. 1400, which we may call the period of epigraphic chronology, or briefly the epigraphical period, the extreme variations seldom exceed the tenth part of a day :—

English equivalent of the moment of occurrence of mean new moon at the beginning of Vaiśākha lunar month in	Sūrya siddhānta.	First Ārya siddhānta.	Brahma siddhānta.	Siddhānta Śiromani.
A.D. 400	April 10·3304	April 10·3145	April 10·3252	April 10·8730
A.D. 900	April 2·4862	April 2·4871	April 2·4446	April 2·4993
A.D 1400	March* 25·6421	March* 25·6734	March 25·5640	March 25·6255
A.D. 1900	April 29·3285	April 29·3903	April 29·2140	April 29·2824

2. *Sūrya siddhānta.*—Of the several siddhāntas referred to above, the Sūrya siddhānta is the one system which has found universal acceptance in India, and it has been adopted by almanac-makers through the length and breadth of the Indian Continent for at least a thousand years past; so that, in verifying any date in an Indian inscription, copper-plate, or literary work during this period, the principles of the Sūrya siddhānta have to be applied in the first instance, and only if they fail, has the applicability of any other siddhānta to be considered. In Southern India alone, and even there, only in respect of sankrāntis, i.e., the commencement of solar months, the first Ārya siddhānta, a system generally referred to the fifth century A.D., has been in use for a long time past. Elsewhere, and for all other purposes, the Sūrya siddhānta may be said to be in use, and to have been in use, universally, throughout India.

3. Since panchāngas, based on the Sūrya siddhānta, are still the most popular ones in India, it may be affirmed that the Indian people, as a whole, are satisfied with its results to-day, just as they were satisfied with them a thousand years ago. New moons and full moons and the sun's tropical longitude, as well as eclipses, may still be calculated, with a very fair amount of precision, with the

* This was not the Vaiśākha new moon by the Sūrya and Ārya siddhāntas, but for the present purpose this discrepancy may be neglected.

sole help of tables based on the venerable Indian system of the Sūrya siddhānta. As a system of pure chronology, too, it has probably not its equal anywhere in the world. Chronology is based on astronomy; but while astronomy is studied in the laboratories and observatories of mathematicians, chronology is meant to be applied and used everywhere. The chronological system of the Sūrya siddhānta, though complicated in appearance, and incrusted with astrology, in which the author has no belief whatsoever, is yet, when released from its accidental encumbrances, sufficiently simple, and its terms and methods have, by dint of use, been rendered familiar to the Indian people at large. If for no other reason, at least for the sake of its antiquity and on account of its use in the interpretation of ancient Indian dates and in the reconstruction of Indian history no less than in the regulation of present day practice over a great part of India, such an ephemeris as the present one, based mainly on the Sūrya siddhānta, deserves to be on record.

SECTION ii.—*Main features of present method.*

4. According to the author's method, the turning points of the solar and lunar reckonings of time are (1) the moment of commencement of the Indian solar year, and (2) the moment of occurrence of the first new moon in the solar year. Both moments *might* be reckoned from 0 Kaliyuga which for *Sūrya siddhānta* was the midnight between 17th and 18th February 3102 B.C., and for other siddhāntas the moment of mean or Lanka sunrise (6 a.m.) on 18th February 3102 B.C. The moment of 0 Kaliyuga was also a moment of new moon, that is, the mean longitude of both sun and moon was then 0°. But for the purposes of the present system, the commencement of the year 0 Kaliyuga has to be taken back, by 2·1707 days in the case of the Sūrya siddhānta and by a similar period in the case of each of the other siddhāntas. This period is called the *śodhya*, which is defined as the interval between the moment when the sun reaches 0° true longitude and the moment, rather more than two days later, when he reaches 0° mean longitude every year. The śodhya is dealt with fully in paragraphs 198 to 213 below, and the tables appended thereto. It will be seen from the different Eye-tables that even where there is no other difference between two siddhāntas (e.g., between Brahma siddhānta and Siddhānta Śiromaṇi), the difference in respect of the śodhya makes two tables necessary for computing the commencement of the solar year and the first new moon in each solar year. See also paragraph 191 below.

5. The interval between the commencement of a solar year and the first new moon in the solar year is a most important datum in the author's method, since on this interval depend (1) the time of occurrence of subsequent new moons in the year, (2) the incidence of *adhika* and *kshaya* months, (3) the exact interval between the ending moment of a particular tithi and the ending moment of its attendant ***nakshatra*** or *yoga* and (4) the calculation of solar and lunar anomalies for tithis.

6. Another important respect in which the author's method differs from all the others hitherto published for computing tithis, nakshatras and yogas, is the series of anomaly and equation tables (Eye-table, sections **e** to **i**, pages 171—194) for the sun and the moon under the various siddhāntas, whereby the absolute ending moment of a tithi, a nakshatra or a yoga, is arrived at by means of a single addition to, or subtraction from, the mean ending moment, instead of by a series of approximations. How this is effected will be explained in Chapter IV on the construction of the tables, Section iii, pages 74 to 81.

SECTION iii.—*Luni-solar character of the Indian year.*

7. Like the lunar calendar of the Jews, and unlike that of the Muhammadans, the Indian calendar may be described as luni-solar, since such of its periods of time, as are regulated by the movements of the moon, are also tied to divisions of the solar year. A lunar tithi is not counted at all unless the ***sun*** rises upon it. A tithi, nakshatra, or yoga may begin, or end, at any moment of the day, but the tithi, nakshatra, or yoga pertaining to a day is that which is current ***at sunrise***. A lunar month has its name determined by, though not always

etymologically derived from, the next following *solar* sankrānti: if there are two lunar months equally entitled to have their name determined by a particular solar sankrānti, they both receive the same name and one, the first, is called *adhika*. On the other hand, if a new moon is followed by two sankrāntis before it is followed by another new moon, the lunar month which would ordinarily have had its name determined by the second of the two sankrāntis is suppressed and is said to be *kshaya*, that is, in defect. Lastly the lunar year, beginning with the lunar month Chaitra, is named after the *next solar year*. These considerations suffice to prove that the Hindu lunar year is properly a luni-solar year.

8. Lunar periods of time are characterized by an element of certainty or rather of palpable evidence, not found in solar periods, and in another sense the actual moments of lunar phases are marked by much greater uncertainty than solar sankrāntis. We shall consider each of these propositions.

9. *Palpable evidence of lunar periods.*—We cannot visibly perceive in the heavens the fact that the sun has completed any definite stage in his annual course: but new moon, when the moon's longitude is the same as the sun's, is a patent fact: so are full moon and each quarter of the lunar month. There cannot be a difference of a whole day between the moment of new moon in one part of the country, and the same moment in another part, just as there might be in the commencement of a solar month (paragraph 14 below). If an inscription states that a certain tithi fell on a Monday, and by calculating backwards we trace the tithi to a Saturday, we may be quite certain that there is some error in the inscription.

10. On the other hand, there are greater fluctuations in the moon's than in the sun's movements, in the sense that the actual time of new moon may be as much as 14 hours before, or 14 hours after, the time of *mean* new moon. Two calculations are therefore necessary to determine the time at which the moon reaches any particular stage of her course: we must first ascertain the *mean* time, which is simply the expected time, taking an average over very long periods; and then we must calculate the *actual* time by means of a correction of the mean time according to the moon's and sun's *anomaly* at the particular moment. Both these operations can be performed very easily and very accurately, that is to say, in exact accordance with the siddhāntas, by means of the Eye-tables in the present work. The correction is called in modern astronomy a correction for the sun's and moon's *equation of the centre*. There are also one or two other minor corrections recognized in modern astronomy, but the siddhāntas do not make them.

SECTION IV.—*Commencement of the solar month or sankrānti.*

11. The astronomical commencement of a solar month is the moment of *sankrānti*, i.e., the moment when the sun enters a constellation of the zodiac. To ascertain the moment of sankrānti, we must add up two figures, namely, (1) the day and fraction of day of the English month entered in Table II or in the head lines of the Ephemeris against "Commencement of the solar year," and (2) the days and fraction of day entered in the Eye-table, section **a** or in the book-marker as the collective duration of days up to the month of which we wish to know the sankrānti or moment of commencement.

12. Though the moment of a sankrānti is the same all over India for the same siddhānta, the commencement of the corresponding month for *civil* purposes is not necessarily the same all over India. The following rules on the subject are adopted from Messrs. *Sewell and Dikshit's* "Indian Calendar":—

(1) In Orissa the solar month of the *Amli* and *Vilāyati* eras begins on the day of sankrānti, at whatever moment of the day the latter may happen. Accordingly in Orissa, the solar months begin on the sankrānti days.

(2) In Bengal, when the fraction of the day at which the sankrānti happens does not exceed 45 ghaṭikas (midnight) the solar month begins on the next day; and when the sankrānti occurs after 45 ghaṭikas, the solar month begins on the next day but one. Accordingly the Bengal months corresponding to *Āni* A.D. 1910 (Bengal solar *Āshāḍha*) and to Malayālam *Dhanus* A.D. 1910 (Bengal

solar *Pausha*) commenced on 15th June and 16th December 1910 respectively and not on 14th June and 15th December 1910 (the days of the sankrānti), while Bengal solar *Māgha* in A.D. 1910–11 did not commence till 15th January 1911 (i.e., two days after the sankrānti).

(3) In Southern India, in the Tamil country, when the fraction of the day at which the sankrānti occurs does not exceed 30 ghaṭikas (i.e., when the sankrānti occurs, roughly, before sunset) the solar month begins on the same day. That is why, for instance, the beginning of Tamil *Āni*, A.D. 1910, coincided with the day of the sankrānti, 14th June 1910. When the sankrānti occurs after 30 ghaṭikas, the solar month begins on the next day. Examples will be found on any page of the Ephemeris. The authors of the "Indian Calendar" also state that in Malabar, when the sankrānti occurs after 18 ghaṭikas, the solar month commences on the next day.

SECTION V.—*The day of the solar month.*

13. This citation, so familiar in the European calendar, is unknown in India, in the epigraphical period, except in Southern India, and even there it occurs only in a small number of cases. When it does occur, it is a valuable means of verification, provided we know the particular siddhānta to be applied: because the combination of a particular solar day of a month with a *vāra* or week-day, a particular tithi and a particular nakshatra, may not recur for a century or possibly for four centuries. On the other hand, if we laid too much stress on the solar day of the month, and were wrong in the assumption of the siddhānta, our result might be wide of the mark by a century or two. This risk of error has been amply illustrated in a recent pamphlet* which shows that a whole series of Chōḷa and Pāṇḍya dates could be transposed by a century by merely supposing the Brahma siddhānta to have been followed, instead of the Ārya siddhānta and that another similar transposition could be effected by following the "Orissa rule" for the commencement of a *sankrānti* (vide paragraph 12 supra) instead of the "Tamil rule." The author of that brochure, however, overlooked the important consideration that if in even one of a series of such dates mutually connected in time, there was a reference to a Śaka date, which confirmed the Ārya siddhānta and the "Tamil rule" hypothesis, then it must follow that no other siddhānta and no other "rule for sankrāntis" can be applied to the whole series.

14. Owing to various causes, principally the differences in the length of the solar year, in the sun's śodhya, in the sun's anomaly table, and in the "Sankrānti rule," the day of solar month by a particular siddhānta is often (and in the case of the Brahma siddhānta, regularly, during the epigraphical period) discrepant by a whole day from the result arrived at by using another siddhānta, and if both siddhānta and the sankrānti rule (paragraph 12) were varied simultaneously, a difference of two days in the result could be produced. But not only does the bewildering array of siddhāntas and sankrānti rules *not* cause in practice a multiplicity of solutions and a general uncertainty of dates,—the thesis propounded in the pamphlet just referred to,—but the application of the Ārya siddhānta and the "Tamil rule" to the whole series of dates receives more ample confirmation than before by the mention of Śaka dates in some of the inscriptions which by internal evidence are mutually connected in time. (See the Pāṇḍya dates in Part II of Volume 1).

15. It must not also be overlooked that palæographical tests are in almost every case absolutely indispensable to verify a date, and where the period is such that a difference of 100 years makes a difference in the kind of script in use (as was the case, for instance, in A.D. 1100 compared with A.D. 1200 for Tamil script), the astronomical verification should be kept within the bounds of palæography and not stray into any century *ad libitum.*

SECTION VI.—*The week-day.*

16. The week-day is the crucial test in the vast majority of verifiable Indian dates and in the absence of a week-day, an Indian date is usually pronounced

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* "Some Śaka dates in inscriptions" by Mr. Venkatasubbiayya of the Mysore Archæological Department, 1916.

unverifiable* unless there is an eclipse in the date. To "verify" a date is to show that it is equivalent to a particular day, month and year consistently with all its details, or with the greater number of its details, and that it would be inconsistent with any other day *during a certain number of years*. For instance, a date, such as "Monday, 8th tithi in the bright fortnight," with mention of month, or "Monday, 8th tithi and nakshatra Anurādha," without mention of month, can be verified as a rule only for a period of 3, 7 or 10 years, because after this period it will recur with the same details. If in such a case the year also is given, it may be possible to show that all the details are consistent with the given year and not with any other year for the next 3, 7 or 10 years, so that it becomes probable that the year given in the date is correctly cited. Where we have a date that merely gives a tithi, a nakshatra, and a year, without the week-day, we say that the date cannot be verified, i.e., *proved* free from the probability of error, because every year must contain such a tithi and such a nakshatra somewhere, and we cannot assert with any degree of confidence that the year-date is free from error. Numerous examples of verifiable and unverifiable dates are given in the introduction to the second part of volume I of the Ephemeris.

17. The week-day appears to have been frequently relied on in inscriptions to distinguish the day on which a tithi or nakshatra commenced from the day on which it came to an end.

SECTION vii.—*The tithi or nakshatra of a day and of a moment.*

18. Over the greater part of India, a day is known normally as the day of an eighth, ninth or any other *tithi*, or of Aśvini, Bharani, or any other *nakshatra*, rather than as the eighth, ninth or any other day of a solar month as in Europe. The tithi or nakshatra which is identified with a day is that tithi or nakshatra which was current at sunrise on the day in question, and though a tithi or nakshatra may have ended the next minute after sunrise, and the next tithi or the next nakshatra may have been current for the whole of the remaining day, it is the tithi or nakshatra current *at* sunrise which gives its name to the day in *ordinary* Indian parlance.

19. Nevertheless it is the case that in numerous well-attested inscriptions, the tithi or nakshatra quoted is not that which was current at sunrise on the day in question but that which commenced at some part of the day and would be current at sunrise only on the *next* day. Such a citation may be distinguished as the day of *commencement* of a tithi or nakshatra or "the following day's tithi" or "the following day's nakshatra" (usually abbreviated by the present writer as *f.d.t.* or *f.d.n.*).

SECTION viii.—*The civil day and its English equivalent.*

20. Indian time is kept in ghaṭikas (Tamil nāligai), or sixtieth parts of a day, each *ghaṭika* being equivalent to 24 minutes of English time (⅖ of an hour), and in *palas* (Tamil *vinādis*) or sixtieth parts of a ghaṭika, each *pala* being equivalent to 24 seconds of English time. The *ghaṭikas* and *palas* are reckoned, not from midnight to midnight as in English time, but from sunrise to sunrise. Now, as the moment of sunrise depends on the latitude and longitude of each place, there should, strictly speaking, be as many *panchāngas* as there are places in India. Indian astronomers get over this difficulty by calculating time in the first instance according to one central latitude and longitude, and then applying the necessary corrections in order to deduce the time for other places. The central latitude is the equator and the central longitude is that of Ujjain (75° 46′ 6″ east of Greenwich) where there was an ancient observatory. To combine the central latitude and the central longitude, they imagined an island called Lankā in the Indian Ocean, situated on the equator and having the same longitude as Ujjain. This Lankā is, of course, not Ceylon.

21. The civil day (with its multiple, the week) is the one measure of time that is common to European and Indian reckoning, everything else (year, month, ghaṭikas, palas, hours, minutes, seconds) being different in the two systems. Accordingly, the civil day and decimals of a day have been adopted throughout the present work for expressing all manner of Indian dates as well as for working out

* For the verification of an eclipse without a week-day when the positions of five planets are recorded, see Chapter V, section ii, paragraphs 247 to 271 below.

ending moments of *tithis*, etc., and also for verifying the correspondence of English and Indian dates. Any decimal of a day can be converted readily into Indian *ghaṭikas* and *palas* (Tamil, *nāligais* and *vināḍis*) or English hours, minutes, and seconds by means of the Eye-table **r** or Table VI or the book-marker inserted in each volume of the Ephemeris. To assist the reader in very exact computation, the fractions expressing minutes have been carried far enough in Table VI to show the recurring places. If, for instance, we wish to know how many hours, minutes, and seconds are equivalent to ·40490 of a day, we turn to Table VI and find that ·40486 of a day is equal to 9 hours 43 minutes. The remainder of the decimal fraction is ·00004 which, the same table informs us, is between 3 and 5 seconds. So the answer is 9 hours 43 minutes 4 seconds. The same decimal fraction is equivalent in Indian time (as we may see from Table VI) to 24 ghaṭikas, 18 palas.

SECTION ix.—*Mean and actual moment of phenomena.*

22. The most ordinary problem in the Indian calendar is, to determine when a particular astronomical phenomenon was completed, e.g., an elongation of the moon from the sun measured in arcs of 12 degrees each and shortly called a *tithi*; the reaching of a longitude of so many degrees by the moon, called a *nakshatra*; the completion of so many degrees of longitude by the sun and moon, supposed to travel in opposite directions, called a *yoga*; or the actual completion of so many degrees by the sun, called a sankrānti, when the number of degrees is computed by *rāśis*, i.e., in multiples of 30 degrees. There is no *direct* means, known to ancient or modern astronomy, of computing these ending moments, as they are called, because at no two successive moments does any heavenly body move at the same rate or pace. Nevertheless the "anomalies," as they are hence called, can be tabulated, because, taking long periods into consideration, the mean period of revolution of a heavenly body, e.g., the moon or any of the planets, is fairly, and for all practical purposes rigorously constant, and we have only to attach to each "anomaly" its own "equation," or, variation from the mean. In other words, the answer to the question, what is the actual position of a heavenly body at any moment ?—is furnished by the algebraical sum of the *mean position* and the *equation*, corresponding to the *anomaly* at that moment. It will be seen, however, from what follows that the Indian calendar aims at determining more than this : it requires not only the phase or phenomenon completed at a given moment, for which purpose we would have to add merely the mean phase of a moment *plus* the *equation* of the *anomaly* at that moment, but it requires the *ending moment of every phase*, for which purpose the ordinary anomaly tables have to be manipulated in a particular way. The exact method how this is done will be explained later (paragraphs 195, 196, p. 76), but it was thought as well to draw attention to this peculiarity of procedure in computing the details of the Indian calendar.

SECTION x.—*Explanation of headings and columns in the ephemeris.*

23. *Method of verification and abbreviations.*—The chief abbreviations used in the ephemeris are (1) the indication of ending moments of tithis and nakshatras as decimals of a day, instead of by *ghaṭikas* and *palas*, or hours and minutes; (2) the substitution of numbers for names of nakshatras. A key to the latter set of abbreviations will be found at the bottom of each page, while a key to the former has been inserted in each copy of the work as a detachable book-marker as well as on the inner side of the cover. For the rest, all the Indian and Muhammadan details corresponding to an English date are given *in its immediate neighbourhood.* Thus in the twenty days commencing with Tuesday 12th December A.D. 836 and ending with Sunday 31st December, there are several changes of Hindu and Muhammadan months, there is one day without its own tithi, one day without its own nakshatra, and one day with two tithis. All these changes and facts are visible at a glance without having to be gleaned with much trouble, from the top, bottom and sides of the page, as in an ordinary Indian panchānga. Thus on Tuesday 2nd December A.D. 836, it is clearly indicated that it was the 20th day of *Dhanus* or *Mārgali* month of Anala year, and *bahula panchadaśī* or *amavāsyā* of Lunar *Mārgaśirsha* ending at ·12 (= 7 ghaṭikas or 3 hours after mean sunrise),

a day of nakshatra "Purva Āshāḍha" (No. 20) ending at ·58 of day (= 35 ghaṭikas, or 14 hours after mean sunrise), and lastly the 28th day of *Zi-l-hijja* month of Hijra 221. It is equally clear that Friday 22nd December was the first day of *Makara* or *Tai* month of the same year *Anala*. The change from the last day of Hijra 221 to the first day of Hijra 222 on Thursday 14th December A.D. 836 is marked with equal clearness.

24. *Cyclic and other years.*—The headings at the top of each page comprise (1) the symbols for solar and lunar eclipse and the abbreviations for *Amāvāsyā* and *Paurṇimā*, (2) the numbers of years in the different eras, (3) the names of samvatsaras or cyclic years in Northern and Southern India, and (4) the commencement of the Indian year according to *Sūrya* and *Ārya siddhāntas*, according to the *Kollam* year, and according to *Hijra*. The *Kollam* year is a current one, like the A.D. year, while all the other Hindu years, Śaka, Vikrama, Bengal san and Kaliyuga, are expired years. It should be noted that the Kaliyuga years quoted in the ordinary South Indian panchāngas are current and will be found to exceed in each case the Kaliyuga year marked in this book by one. A similar remark applies to Bengal san. The names of solar samvatsaras, *Prabhava*, *Vibhava*, etc., are quoted not only at the top of each page, but above the name of each Tamil month. Thus it has been possible to give in this book, for each English date, the Tamil (or Malayālam), Telugu (or Kanarese) and Muḥammadan equivalents with as much fulness as in the ordinary pocket diaries. For example, against Tuesday 21st March A.D. 836, one may read off in this book, as in a pocket diary, "*Anala* Samvat, *Chittirai* 1" or "*Meṭam* 1," "*Anala* Samvat *Adhika Chaitra* Bahula Panchadaśī, Nakshatra Revati, and Hijra 221 Rabī-ul-awwal 28."

25. *Solar and lunar reckonings.*—The various calendar systems in use in India may be divided into two main groups as shown in this book, namely, the solar reckoning, comprising the English, Tamil, Malayālam, Oriya and Bengali reckonings; and the lunar reckoning, used all over India, and including the Muhammadan and Jewish reckonings. The Indian calendar is sometimes styled luni-solar, because its lunar months and years cannot recede by more than 29 days from the corresponding solar months and years, whereas the Muhammadan or Hijra year recedes by 10 or 11 days every year and will therefore be found to commence in all months of the Indian and English years.

26. *Column headed "Month and day."*—Solar months in India are generally named in Sanskrit after the rāśis or signs of the zodiac, "Mesha," "Ṛishabha," etc., but in Tamil they are also known by another set of names, more or less modified from names of nakshatras or lunar months, namely, "Chittirai," "Vaikāśi," etc. Both sets of names, "Mēsha-Chittirai," "Ṛishabha-Vaikāśi," "Mithuna-Āni," etc., are quoted in this column. The days of the solar month are reckoned according to an ancient Tamil practice, from the sankrānti of the *Ārya* siddhānta. The rules for determining the commencement of the solar month, according to the Tamil, Malayālam, Oriya and Bengali systems, with examples. have been given in paragraph 12 *supra*. A difference of a whole day or of two days would ordinarily be found between Tamil days of solar months and the corresponding Bengali days.

27. The number of days in a Tamil month is not the same every year. Thus Chittirai has ordinarily 31 days, but may occasionally have 30. The fact, alluded to by the ancient commentator of *Śilapadikāram*, that Chittirai, in the year when the events described in that poem occurred, had only 30 * days, and commenced on a Sunday, a day of "Svāti" nakshatra, enables us, although the commentator has omitted to mention the year, to infer that the year in question was A.D. 756 and no other. Days of the solar month are now commonly quoted in the Tamil country, but we do not meet them before the beginning of the eighth century A.D. We learn from the ancient Tamil poem *Tolkāppiyam* that a day at that epoch was ordinarily called, as it still frequently is, after its nakshatra. The practice of calling days by their tithi numbers apparently came into use at a subsequent date in the Tamil country, though elsewhere in India the calling of a

* In volume I of this *Ephemeris*, the Chittirai month of the year A.D. 756 is shown as having had the full 31 days; but the author has shown elsewhere (vide Paper iii in the Appendix) that according to the system then current it was quite possible for Chittirai to have had only 30 days.

day by its tithi number is an ancient, in fact, a Vedic practice. Week-days do not seem to have been in common use in the Tamil country much before the beginning of the eighth century A.D. Elsewhere in India, week-days have been traced to the fifth century A.D., but not much beyond. It is a curious circumstance, and one deserving of careful study, that a date in India, one thousand and four-hundred years ago was known by the same week-day as the corresponding day in Europe.

28. *Nakshatras and tithis.*—Every Hindu feast, fast and festival (except sankrāntis) is connected with either a tithi or a nakshatra or both (Chapter III, Section xix, pp. 55 69). A mean tithi extends over ·98 of a day, while a mean nakshatra extends over 1·01 days; but the solar and lunar anomalies may make a tithi longer or shorter by ·58 of a day as a maximum, while the lunar anomaly may similarly affect a nakshatra to the extent of ·38 of a day. Hence the irregular lengths, in time, of tithis and nakshatras, which make the Indian system so complicated in appearance, but which constitute at the same time a most valuable check in chronological studies. Hence also the curious fact that what ought to be a normal state of things, namely, each day having a single tithi and a single nakshatra, is very seldom noticed on the successive days of a *whole* month. Such a phenomenon occurred throughout the month of Vaiśākha, Wednesday 26th March to Friday 25th April A.D. 822 and again, throughout the month of Phālguna, Saturday 26th February to Monday 28th March A.D. 830. The curious reader may pursue the game with the help of this book. It follows from what has just been stated that in the course of a lunar month 2 tithis or 2 nakshatras may ordinarily be found either to occur on the same day or to cover parts of 3 days, the middle day in the latter case being without a tithi, or without a nakshatra of its own. Cases of the same day having two tithis *as well as* two nakshatras, as on *Kārttika, bahula* 11 and 12 (Wednesday 30th October A.D. 709), and other cases (e.g., Saturday 27th June A.D. 705) in which a day had neither a tithi nor a nakshatra of its own can be easily traced with the aid of this work.

29. In this connexion reference may be made to the hallucination that a lunar fortnight with only 13 days does not occur except once in a 1,000 years. In the *Mahābhārata* (*Bhīshma parva*, 3, 32) it is recounted by Vyāsa in the course of his conversation with Dhritarāshtra that he has known of lunar fortnights consisting of 14, 15 or 16 days, but never of one consisting of 13 days, but that since such a one is in prospect or has occurred, there will be a great slaughter of human beings. Other Śāstras, quoted by Dr. Fleet in *Indian Antiquary*, Vol. XVI, for March 1887, reiterate this omen, and it is stated in one of the quotations (commentary on the *Muhūrta Gaṇapati*) that the phenomenon occurs only once in 1,000 years. *If this was the case*, it would be at least a remarkable coincidence that the recent great European War (A.D. 1914—1918) should have broken out absolutely at the middle of a fortnight consisting of 13 days. The fortnight from *śukla pratipad*, Friday 24th July, to *pūrnimā*, Tuesday 4th August A.D. 1914, as will be seen from the "Ephemeris A.D. 1800—A.D. 2000," comprised only 13 days from *pratipad* to *panchadaśī* owing to the occurrence twice, i.e., on the first and on the last day of the paksha, of two tithis on a single day. *But it is not true that the phenomenon takes place only once in a thousand years.* In the absence of a compilation like this Ephemeris, it might be difficult to check the statement, but anybody can satisfy himself from this Ephemeris that the phenomenon occurred in 1805, 1813, 1830, 1847, 1849 (after 36 years as in the Mahâbhârata, *Mausala parva*, 11, 18, and with *grasthodaya* and *grasthāsthamana* also as in the Mahābhārata), 1861, 1864, 1872, 1878, 1880, 1892, 1900, 1903, 1914, 1917, 1920 and will occur in 1928, 1931, etc. Such instances will be found also in the earlier parts of the present work, see for example the years 702, 705, 719, 724, 741, 744, 752, 755, 758, 772 and 775. Comment is needless after noting so many recurrences. The occurrence of such a fortnight in July 1914 was known in January 1914 when the new year's panchāngas were published; nevertheless, no one then predicted that a great war was coming on in July: the "prediction" came after the event.

30. *Adhika and Kshaya months.*—Occasionally, that is seven times in 19 years, a lunar month is repeated twice in the course of the same year. For

instance, in the year A.D. 836 there are two Chaitras, one reckoned from Monday 21st February to Tuesday 21st March, and the other from Wednesday 22nd March to Wednesday 19th April. The first month in such cases has the prefix *adhika* (= additional), and the second the prefix *nija* (= proper). Both prefixes are duly and clearly marked in the Ephemeris. More rarely also, a lunar month is suppressed altogether, and in such cases is known as *kshaya* (= suppressed). Thus in A.D. 770, the month *Pausha*, which ought to have occurred in December-January, was suppressed. The omission of a kshaya month is noted by N.B. at the foot of the page where required. The rules for determining the date of occurrence of additional and suppressed months are clearly given in paragraphs 89 to 91 below.

31. *Nakshatras and ending moments of nakshatras.**—A complete list of Indian nakshatras, with the corresponding fixed stars, as identified by different authorities, is given in Chapter III, paragraph 101. The practice of reckoning time by nakshatras is peculiar to India and China, and has existed in each of these countries from very ancient times. In India, in Vedic times, a lunar month had no other name than that of the nakshatra in which the moon of that month became full. To this day, *Chaitra* is the month in which the moon becomes full when occupying "Chitrā" nakshatra, and so on for the other months. The concurrence of certain tithis with certain nakshatras is thus fixed within narrow limits for every month in the year, and the student of inscriptions should be familiar with the table of concurrence (see the *Eye-table*, section s, pp. 140, 146, 152 below.)

32. *Note on broken periods.*—It is very important that the reader, dealing with the Indian or any other calendar, should know thoroughly how to reckon broken periods. It is generally a question of addition or subtraction, but unless one goes through the process with reflection, there is always a danger of adding or subtracting 1 too much.

To take the simplest case, how many days are there from Friday in one week to Tuesday in the next? Most people would use their fingers in such a case and answer "4" or "5" according as they began the reckoning with Friday or with Saturday. Now, such uncertainty is fatal to exact reckoning, and we should therefore follow certain rules whereby we may avoid all uncertainty.

First of all, we should note that such a question is intelligible only with reference to the *next subdivision of the broken period*: that is, in this case the meaning of the question is, how many days are there from a particular hour on Friday to the same hour on Tuesday. This makes the answer quite certain. From 6 a.m. on Friday to 6 a.m. on Tuesday following, there are 4 days: and the proper way to answer the question is to convert Friday and Tuesday into week-day figures 6 and 3, and to add a whole period (7) to 3 before deducting 6. Thus $7+3=10$; from 10 take 6, and we have the answer, 4 days. Some exercise is necessary in order to do even these simple week-day problems correctly.

The rule about *adding a whole period* when we have to reckon from a fraction of one period to a fraction of the next is very important. How many days are there from 23rd October in one year to 15th March in the next, the second being a leap year? If we refer to the Eye-table q we shall find that 23rd October is the 206th day from 1st April; and 15th March (where we have had to pass 29th February) is the 350th day. Deduct 206 from 350. Answer, 144 days.

To take another case, suppose we are required to deduct the longitude of Jupiter from the longitude of the sun, it being given that the former is 300 degrees and the latter 29 degrees. To answer this question we must first add 360 degrees (the whole period in this case) to 29, and then from the total 389 subtract 300; answer, 89 degrees.

If the 1st of a Tamil month be the 15th July, what will be the 7th of the Tamil month? In such cases we must *make the same addition to or the same deduction from the one side as we make in regard to the other.* In the example before us, the addition to be made is 6, and the answer, 21st July.

If the 1st of Tamil month be the 15th July, what will be the 29th of the Tamil month? We add 28 to each side. Therefore the answer is $15+28=43$rd July, from which we deduct the whole of the completed period (July =) 31 days. Final answer, 43 *minus* $31=12$th August.

* The Nakshatras were primarily certain constellations serving as permanent land marks in the ecliptic but in later Indian Astronomy they have come to mean certain fixed measures of space (generally 13⅓ degrees) in the ecliptic.

CHAPTER II.—EXPOSITION OF THE EYE-TABLES.

THE WHOLE SYSTEM OF COMPUTATION EXPOUNDED BY MEANS OF THE EYE-TABLE.

33. The student desirous of acquiring the ability to compute with exactitude any tithi, nakshatra, yoga or vāra will find *all* the material necessary for him in the Eye-table of the particular siddhānta which he wishes to study, whether Sūrya, first Ārya, Brahma, or Śirōmani. The first six pages of each Eye-table 153 to 170, contain all that is necessary for obtaining any of these results correct to two places of decimals, while pages 171 to 194 give expanded tables of equations which will enable the student to obtain results correct to four places of decimals, viz., down to *palas* in the Indian scale of time; illustrative examples are also prefixed to each Eye-table. For the reason stated in paragraph 198 below, no separate Eye-table is necessary for the second Ārya siddhānta.

34. It will be seen that each Eye-table is divided into 26 parts, **a** to **z**, lettered serially in the margin of the table (**z**, however, stands first, as explained below, for a mnemonical reason), and the following explanation adheres to this order. To facilitate reference, a loose copy of the principal Eye-table, that of the Sūrya siddhānta is supplied with this work.

EYE-TABLE, SECTION **z**.—*The signs of the zodiac.*

35. This section which is placed at the head of each Eye-table does not contain any calculated tabular matter, and is styled **z** firstly, to arrest attention, and secondly, because it refers to signs of the *zodiac*.

36. *Order of signs of zodiac or rāśis and longitude of commencement of each sign or rāśi.*—The twelve signs of the zodiac or *rāśis*, whose names are preserved in the Malayalam names of months, were borrowed by the Hindus from a western source, Chaldean or Greek, as is apparent from the procedure of Varāhamihira who names each sign first in Greek (Kriya, Tauro, Jimuthro, Kankri, etc.), and then in Sanskrit (Mesha, Rishabha, etc.). The longitudes of the *rāśis* are reckoned in Indian astronomy from a fixed point in the heavens, generally identified as **z** *Zēta Piscium*, whereas in European astronomy, the 0° point of longitude is reckoned from the meeting point (which is liable to variation from year to year) of the celestial equator and the ecliptic. In European astronomy this meeting point is conventionally called the first point of Aries, but it is not now in the *constellation* Aries, because every year, owing to the precession of equinoxes, the first point of Aries moves back 50 seconds of an arc along the ecliptic. About A.D. 532 the first point of Aries of European astronomy was identical with the 0° longitude of Indian astronomy, but since then, the former has receded every year, till now there is a difference of 23° between the first point of Aries (European astronomy) and the 0° longitude of Indian astronomy, *vide* paragraph 229 below. For his present purposes, the student need not trouble himself with the difference between the two reckonings of celestial longitude, but he will understand that when, for instance, the planet Jupiter is said to be 15° in *Kanyā*, the meaning is that the longitude of Jupiter is 150° + 15°, or 165°.

37. The Eye-table shows how the solar months receive different names in Bengal, in the Tamil country, and in Malabar, which are the principal tracts of the country (other than Orissa) where solar months are, or have been, ordinarily used.

EYE-TABLE, SECTION **a**.—*Moment of sankrānti in days of solar year and decimals of a day.*

38. The moment when the sun enters a rāśi, i.e., when his longitude is 0°, 30°, 60°, etc., is called a *sankrānti*, an epoch with which Hindu festivals are often associated. The first sankrānti or Mēsha sankrānti is the most important of all, being the beginning of the Indian solar year. In the European calendar

the year begins at midnight between the 31st December and the 1st January, and each month has a fixed number of days, 31 or 30 or 29 or 28 as the case may be. The Indian solar year may begin at any moment of the day. This moment, to five places of decimals, is given for each century year in section **k** of each Eye-table and it is given for every A.D. year in Table II, pp. 184 to 263. In the same manner each month may begin at any moment of the day and the duration of a month cannot be expressed as a whole number of days, but can only be stated as so many days and a fraction, which is given in section **a** of the Eye-table. Nor is this all. The actual duration of a month under each siddhānta varies, theoretically, according to the epoch: for instance the duration of Mesha month was not the same under the Sūrya siddhānta in A.D. 500 as it is now. For each epoch the duration has to be calculated according to a method which is explained in Chapter IV below, page 83. Still the variation, even over a period of 2,000 years, is not very material and we generally apply to the whole period the durations of months calculated for a particular epoch. The durations of months given in the Sūrya siddhānta Eye-table were calculated by the late Sankara Balakrishna Dikshit for the epoch A.D. 1137 and have been verified by the present writer for A.D. 1165 as shown in Chapter IV, paragraph 201. The durations of the months according to Brahma siddhānta are different from those according to Siddhānta Śirōmani, because the sōdhyas in the two siddhāntas are different.

EYE-TABLE, SECTION **a**—*continued. English date corresponding to each sankrānti A.D. 1900.*

39. Under this heading the Eye-table gives the correspondence of the sankrāntis, according to each siddhānta, to the days of English months. Thus it is stated in the Eye-table that the Mēsha sankrānti in the year 1900 A.D. corresponded, according to the Brahma siddhānta and the Siddhānta Śirōmaṇi, to April 11, and according to the Sūrya siddhānta and the Ārya siddhānta to April 12. Similar differences will be found between the two sets of siddhāntas in the remaining months of the year 1900. If the reader runs his eye down column **k** in the Eye-table, he will find that, whereas in A.D. 400 the Mēsha sankrānti, or commencement of the Indian solar year, according to the Brahma siddhānta as well as the Siddhānta Śirōmaṇi, fell on March 16, the same sankrānti in the year 1700 A.D., even before the application of the Gregorian reform of the calendar began to affect the variations between the Indian and the European calendar, fell on March 27, a difference of 11 days for 1,300 years. This is a result of the Indian calendar being regulated, not by the tropical year, like the European calendar, but by the sidereal year. The exact equivalent in English month and day, of any particular sankrānti according to any particular siddhānta can be calculated in the least possible time by means of the Eye-table, as shown in the illustrative examples, but the present intimation in Section **a** of the Eye-table is merely intended to show how in practice the beginnings of Indian solar months run in relation to the beginnings of European calendar months.

EYE-TABLE, SECTION **a**—*continued. Lunar month; each month commences before the sankrānti noted in next column.*

40. This line of the Eye-table gives the names of the 12 lunar months, Chaitra, Vaiśākha, Jyēshṭha, etc. Except in Southern India and in Bengal, the ordinary civil reckoning over the whole of the Indian continent is by lunar months; and even in the excepted provinces, the calculation of days according to the lunar month has to be made much more often than the reckoning according to solar months. To understand the lunar reckoning in all its details is to understand in its entirety the Indian calendar system. Not very much by way of a detailed explanation of the lunar month can be attempted in this place, but it is necessary to note one or two points that are indispensable to a proper understanding of the subject at this stage. The first point is, that in the ordinary scheme of 12 solar and 12 lunar months in a year, *each lunar month is regarded as commencing before the date on which a particular solar month begins and receives*

its name from that circumstance. For instance, the lunar month called Chaitra must occur within 29·53 days before the Mēsha sankrānti, or the commencement of Mēsha solar month; the lunar month Vaiśākha *must* occur within the same interval of 29·53 days before the Ṛishabha sankrānti, or commencement of the Ṛishabha solar month: and passing to a later month, the 7th lunar month Kārttika must occur within an interval of 29·53 days before the Vrischika sankrānti, or commencement of the Vriśchika solar month. Now the ordinary interval between any solar sankrānti and the next is 30 or 31 days as in the European calendar, but the ordinary interval between the commencement of a lunar month and the commencement of the next lunar month is only 29·53 days; so that it must sometimes happen that more than one lunar month commences in the interval between two solar sankrāntis or, which is the same thing, between the commencements of two solar months. Following the principle first laid down, in the words italicized above, both the lunar months occurring in such a case in the interval between two solar sankrāntis receive the same name, the first being called *adhika* or intercalary, and the second *nija*, or true. Intercalary lunar months are to be found in many calendars other than the Indian, but the Indian calendar has for many centuries rigorously enforced the principle stated above in determining the naming of intercalary or *adhika* lunar months. As an *adhika* lunar month is of frequent occurrence, seven such months being due in the course of 19 years, it follows that the solar month, which is ordinarily an item neglected in civil reckoning over the greater part of India, is nevertheless indispensable in order to ascertain whether there will be an *adhika* month in a particular year. And since the intervals between the same solar months are not the same according to the different siddhāntas, it also follows that when there is an *adhika* month according to one siddhānta, there may not be an *adhika* month under another siddhānta. In the list of lunar months furnished in the section of the Eye-table now under consideration, No. 13 Chaitra is shown as a recurring month, but this is simply given as an example and, in practice, any lunar month may in turn be an *adhika* or intercalated month.

EYE-TABLE, SECTION **b**.—*Increase in days* (1) *of lunar month, and* (2) *of sun's anomaly.*

41. This line of the Eye-table merely gives multiples from 1 to 13 of 29·5306 days for each lunar month. The use of this line will be understood when we come to calculate the sun's anomaly at a particular moment (paragraph 54, page 17 below).

EYE-TABLE, SECTION **c**.—*Increase of moon's anomaly when the interval between Mēsha sankrānti and the first new moon in the solar year is* 0·00 *day.*

42. The length of the synodical month, or the interval between one new moon and the next is 29·5306 days, whereas the length of the moon's anomalistic month or the month which determines the irregularities in the moon's motions, is 27 5546 days. The difference between these two periods is 1·976 days and this difference increases from month to month. The moon's anomaly at the commencement of each solar year is obtained by adding the quantities in sections **m** and **p** of the Eye-table. This anomaly is then increased by the interval between the commencement of the solar year and the first new moon in the solar year, for which purpose we add the quantities in sections **l** and **o** in the Eye-table as shown in the illustrative examples. We have now got to the moon's anomaly at the first new moon in a solar year. If to this quantity we add one of the quantities in section **c** of the Eye-table, we get the moon's anomaly at the commencement of the various lunar months in a given year. Section **c** of the Eye-table is, therefore, an important datum for calculating the lunar anomaly, and we shall duly make use of it for that purpose later on page 17.

EYE-TABLE, SECTION **d**.—*Tithi equivalent in days.*

43. In the Indian calendar system the days are ordinarily reckoned, not from midnight to midnight as in the European calendar, but from sunrise to sunrise;

and further, the lunar month of 29·53 days is divided into 30 tithis, so that each tithi is not exactly one day, but ·9843 of a day. A tithi may end at any part of a day and in theory, in order to know what is the tithi at any moment of the day, it is necessary also to know what tithi came to an end that day and when it came to an end, and what tithi is running at the moment in question. In practice, however, and for most purposes of civil reckoning, the tithi for a day is fixed by that tithi which was current at sunrise of that day and no account is taken of any other tithi that may commence during the day, except for astrological purposes. But the complications connected with tithis do not end here. It has already been observed that the Indian calendar takes account not only of mean periods of time which, properly speaking, should be the sole basis of civil reckoning and which, in all probability, did exclusively govern the Indian calendar in ancient times, but also of the *actual* ending moment of a tithi, a month, a year and so on. This minute concern about actual ending moments is peculiar to the Indian calendar and necessitates constant reference to a panchānga or Ephemeris in which the ending moments have been previously calculated.

44. The ending moment of a tithi is the moment at which the moon is removed from the sun by an exact multiple of 12 degrees. The moment when the moon is exactly 12 degrees distant from the sun, called in European astronomy an elongation of 12 degrees, is the ending moment of the first tithi; similarly the second tithi ends when the moon is exactly 24 degrees from the sun, and full moon is the moment when the moon is 180 degrees from the sun, i.e., when it is exactly opposite to the sun in the heavens. The determination of the moment when the moon is in each of these several positions is a tedious astronomical process which, in modern astronomy, can be accomplished only by means of a nautical almanac; nautical almanacs are in fact being used extensively by Indian panchāngam-makers of the present day who follow the so-called Drig-ganita system which, however, is no system at all of *Indian* astronomy, but is a conventional name for a system based on a European or American nautical almanac. The exact *modern* astronomical process for determining a tithi would require the employment of quite a large number of equations, some of them very minute and very complicated in character; but the Indian calendar has for a long time used for the determination of tithis only two equations, viz., one depending on the moon's anomaly and the other on the sun's anomaly. Both these equations are also used for yogas, and one of them, the moon's equation, is used for nakshatras. Similar equations, called the annual parallax and the anomalistic equation, are used to determine the exact position of planets in Indian astronomy (Table IV).

EYE-TABLE, SECTIONS e, f, g.—*Moon's equation of the centre and moon's anomaly in days and decimals of a day.*

45. In these portions of the Eye-table we are confronted directly with the equations of the moon last mentioned. These equations are expressed to two decimal places from ·00 to ·41 in the case of tithis; from ·00 to ·38 in the case of nakshatras; and from ·00 to ·35 in the case of yogas. If these equations were carried to four places of decimals, as they must be when we wish to ascertain the ending moments of tithis, nakshatras and yogas in palas as well as ghatikas, we would need much more extended tables, which are given in a later portion of the Eye-table (pages 171 to 194 below). For practical purposes, even of accurate calculation, in Indian epigraphy and in Indian history, we do not need to use more than two places of decimals of a day, and that is why the Ephemeris gives the ending moments of tithis and nakshatras to two decimal places.

46. In order to know what equation to apply towards the determination of the ending moment of a particular tithi, nakshatra, or yoga, we must know the anomaly of the moon at that moment. The anomaly of the moon is first of all given for the commencement of each solar year (vide sections **m** and **p** of the Eye-table) and to this quantity we add the successive periods of time which will bring us to any given moment in the year for which we wish to know the tithi, nakshatra, or yoga. In other methods for the verification of the Indian calendar, it is usual to express the anomaly of the moon or of the sun as so

many degrees from perigee or apogee. In order to simplify calculation, however, all anomalies are expressed in the present work in days and fractions of a day 360 degrees being equal to one anomalistic month of 27·5545 days in the case of the moon, and one anomalistic year of 365·26 days in the case of the sun. The reckoning of the anomalies in the present work is always from perigee. The anomaly of the moon at any given moment having been ascertained in days, we have to find from sections **e**, **f** or **g**, of the Eye-table the corresponding equation, with its appropriate sign, and apply it according to the rules given in the illustrative examples.

EYE-TABLE, SECTIONS **h**, **i**.—*Sun's equation of the centre and sun's anomaly in days of the solar year, for tithis and yogas.*

47. For tithis and for yogas we require the sun's equation as well as the moon's, and sections **h** and **i** of the Eye-table give us these equations. As the sun's equation does not vary, except in the third place of decimals, for a whole day, the anomalies at pages 154, 160, 166 are given generally in whole days of the year, except where the equation is at a minimum or at a maximum, in which case the exact fraction of the day for which the minimum or maximum is appropriate is also indicated. In the extended anomaly and equation tables which are printed at pages 177, 178, 185, 186, 193 and 194 below, sun's anomalies are given to two places of decimals of a day, and sun's equations to four places of decimals of a day.

48. The 0 day of the sun's anomaly is properly speaking the day and moment of the day in a year when the sun is at perigee exactly (Special Sun-Table I, page 78 below, cols. 6, 12 and 18). Now the sun's anomalistic position on any given day of the year is practically the same, whatever year may be under consideration, and therefore, the sun's equation tables in the present work merely give for each day of the solar year the corresponding equation, viz., the equation of the anomaly corresponding to the day. In the Ārya siddhānta this assumption is quite correct; in the Sūrya siddhānta it is very nearly correct; but in the Brahma siddhānta and the Siddhānta Śirōmani, while the table of anomalies and equations is the same, a correction in the number of days of the sun's anomaly has occasionally to be made, as indicated in the illustrative examples under the Siddhānta Śirōmani Eye-table. The explanation of these variations belongs properly to a more advanced portion of the present work. (See Chapter IV, paragraphs 189 to 191, page 75 below.)

EYE-TABLE, SECTION **j**.—*Perpetual week-day almanac for the European calendar.*

49. The week-day is the meeting ground of the Indian and European calendars, and whatever date we may be engaged in investigating, it is generally useful, and almost invariably indispensable, to know what was the week-day of that date. This information has to be found as quickly as possible, but at the same time accurately. The Indian method for ascertaining the week-day is the primitive one of dividing by 7 the ahargaṇa or number of days which have elapsed since 0 Kaliyuga. Many good methods have been designed and published in modern times for ascertaining week-days, and Eye-table **j** has been selected as being the best of them. It consists in the addition of four figures, viz. (1) a constant for the century, (2) a constant for the odd years in a century, (3) a constant for the month, and (4) the day of the month. The example given in section **j** of the Eye-table, viz., "Find the week-day of 26th January 1844" will illustrate the ordinary use of this perpetual almanac for A.D. years. For a B.C. year, e g., the 15th of March 44 B.C., since B.C. years are reckoned backwards, we must first of all turn the B.C. year into the forward year of a particular century. In this case 44 B.C. is the 57th year of the century beginning with 101 B.C. [Centuries B.C. always begin with 101, 201, 301, etc., and not with 100, 200, 300, etc.] Then we proceed to find the constant for the century 101 B.C. which is 0 and add the constant for the year 57, for March, and lastly 15, i.e., 1 + 2 + 15 = 18. This, divided by 7, leaves as remainder 4, so that we know that the week-day of 15th March 44 B.C. was a Wednesday.

50. An important warning has, however, to be given in regard to week-days in B.C. years. So far as is at present known, the only people who observed week-days in B.C. years were (1) the Assyrians, Babylonians and Egyptians whose week-days do not, however, figure in any known history, (2) the Chaldeans who practised astrology in the Grecian and Roman States and (3) the Jews who appear at a very early time to have borrowed the week-day reckoning from the Chaldean peoples with whom they were associated. The Romans and Greeks, throughout the period of the classical literature which has come down to us, do not seem to have had any practical knowledge of the week-day, except that they knew that the Sabbath or seventh day of the week was a day of rest among the Jews. One solitary* reference to a planetary week-day, and that by the Latin poet Tibullus who was a student of astrology, is all the evidence that occurs in any context showing that the Romans of the first century A.D. possessed an acquaintance with week-days. The Romans as a rule observed the *nundinae* or every 9th day as a market day, and their month was divided into three unequal portions by the Kalends, Nones and Ides. At what epoch the Hindus became acquainted with the week-day is an interesting but obscure point; but since it came to them from a Graeco-Roman source, during Christian times, and subsequent to Ptolemy's date (middle of second century A.D.), as we know from Indian inscriptions and other early references to the week-day in Indian literature, and also from the very few week-days which have come to light in Indian inscriptions and records between the fifth and eighth centuries A.D., we may presume that the week-day was not in common use in India before the eighth century A.D. and not at all in use before the fifth century A.D. In the rather keen controversy on this subject, which is one of constant recurrence in Indian journals and newspapers, it is of importance to bear in mind that, while the original planetary week-day was an instrument of Chaldean astrology and as such known to Greek and Roman *students of astrology in the century preceding the Christian era*, the practical use of the week-day for civil reckoning was probably due to the exigencies of early Christian usage, which found in the week-day a convenient means of naming several important days in the Christian liturgical year, such as Holy Thursday, Good Friday, Holy Saturday and Easter Sunday. The earliest references to the week-day, as an item of *civil* reckoning, are, in fact, to be found in a well-known passage of the Christian Apologist and Martyr, St. Justin, in the first quarter of the second century A.D. We next find the week-day mentioned, as an institution currently familiar, but of recent origin, by Dio Cassius, a Greek historian of the early Roman Empire, about A.D. 225. Dio Cassius also gives an explanation of the order of week-days, which is identical with the explanation given by the Indian astronomer Varāhamihira. By the time of Constantine the Great (beginning of the fourth century A.D.) we find the week-day in common use in the Roman Empire for describing Christian feasts and festivals. This was precisely the epoch at which the Guptas were in power in India, the epoch at which Greek ideas of astronomy, mathematics and medicine flowed freely into India, and the epoch probably at which the week-day began for the first time to make its appearance in India. Between the time, however, of the first appearance of an idea like that of the week-day in any country and its coming into general use, there was bound to be a fairly long interval of possibly two or three centuries ; and we may note that so late as the tenth and eleventh centuries A.D., inscriptions in Ceylon are still wanting in week-days The practical conclusion to be drawn from these various data is that it is vain to look for an allusion to a week-day in any literature, Eastern or Western, in any century B.C. and that any alleged find of such an allusion must be examined very critically. It is characteristic that the very first reference in any history, sacred or profane, in which the week-day

* Dr. J. N. Farquhar Editor of the "Religious Life of India" and other series, has drawn the author's attention to a *graffito* or writing on a wall, discovered in the remains of Pompeii (which was buried on 24th August A.D. 79 by a volcanic eruption), and quoted in *Schiaparelli's Astronomy in the Old Testament* (1905), p. 186 The *graffito* is supposed to have been the work of a Roman slave and consists of six lines scratched in the following order : *Saturni, Solis, Lunae, Martis, Jovis, Veneris*, each line consisting of the name of a week-day in Latin. The omission of [Dies] *Mercurii* (Wednesday) in this enumeration is curious The writer may have been one of the students of astrology who, as presumed in the text *supra*, were acquainted with week-days in the first century A.D and he may have written down the week-days on a wall to assist his memory, and at the same time failed to recall one day. The discovery shows that week-days *were* known in the third quarter of the first century A.D., but it by no means proves that the week-day was then used as an item of *civil* reckoning of time. The place assigned to *Dies Saturni*, followin , the Chaldean order, is significant and points presumably to the astrological character of the *graffito*.

has played a part in chronological investigation, is in connexion with the exact date of the Last Supper and the Crucifixion of Christ. By means of the week-days, occurring in the Gospel narratives of the New Testament, we know that these events must have happened in one of three years, A.D. 29, A.D. 30, or A.D. 33, although it will always remain a disputed point in which of the three years these events happened. *Encycl. Brit.*, 11*th edition, Art.*, "*Bible Chronology, New Testament.*"

51. A *Nota Bene* in section **j** of the Eye-table draws attention to the dates when the Old Style of reckoning ceased in the different parts of Europe, as well as to the date, 14th September 1752, when the New Style was adopted by Act of Parliament in the United Kingdom.

EYE-TABLE, SECTIONS **k, l, m, n, o, p.**

52 These sections of the Eye-table furnish three items of information which must form the first step in any Indian chronological reckoning according to the author's method. For any such reckoning we want to know (1) the exact moment when a solar year commenced, for which purpose we consult section **k**, adding to a figure in that section a quantity in section **n** when necessary; (2) the exact moment of the first new moon in the particular solar year with which we are concerned; this is given in section **l** of the Eye-table, to which we add, when necessary, a quantity in section **o**, deducting again, when necessary, once or twice 29·5306 days; (3) the moon's anomaly at the commencement of the solar year, as given in section **m**, to which a quantity from section **p** should be added for odd years in a century. In applying sections **m** and **p**, however, it should be remembered that the moon's anomaly, to be at all useful, must also be reckoned up to the first new moon in the solar year, for which purpose the quantities in sections **l, o, m** and **p** should be added together. Just as sections **k, l** and **m** give certain information for the first year in a century, sections **n, o** and **p** give the same information for all the odd years of a century.

A PRACTICAL ILLUSTRATION OF THE EYE-TABLE.

53. This is a convenient stage at which we may introduce a simple example illustrating the most usual processes of reckoning in the Indian calendar. The earliest example, so far as is now known, of a well-authenticated week-day in Indian inscriptions is the Eran Pillar Gupta Inscription, which quotes "Thursday" as the week-day of the "12th tithi in the bright half of the lunar month of Āshāḍha" in a year corresponding to A.D. 484. We shall now show how the Eye-table, studied thus far, enables us to calculate the exact English equivalent of this date and also to verify the fact that it was a Thursday. We make the calculation according to the Sūrya siddhānta Eye-table which in all probability was the siddhānta (in an early form) that was used in the actual reckoning recorded in the inscription. The reader will save himself a good deal of future trouble by carrying out carefully the processes indicated below. Section **k** of the Eye-table tells us that in A.D. 400 the solar year commenced on March 17 ·48569. Section **n** further shows that for 84 odd years of the century the fraction to be added for determining the commencement of the solar year is ·73554. We know, therefore, that in the year A.D. 484 the Indian solar year commenced, according to the Sūrya siddhānta, on March 17·48569 + ·73554 = March 18·22123. Similarly, sections **l** and **o** tell us that in the year A.D. 400 the first new moon in the solar year was removed from the commencement of the year by 23·84466 days; to which we add, from section **o**, the interval of the first new moon in the solar year corresponding to 84 years which is 0·54533 of a day. The two quantities being added, we infer that in A.D. 484 the interval between the commencement of the solar year and the first new moon in the same solar year was 23·84466 + 0·54533 = 24·38999 days. The same process, performed with the aid of sections **m** and **p**, informs us that in the year 484 A.D. the moon's anomaly at the commencement of the solar year was 21·75228 + 13·46585 = 45·21813 days. Consequently the moon's anomaly at the first new moon in the same solar year must have been 45·21813 + 24·38999 = 59·60812 days. Subtracting from this, two full anomalistic months (Eye-table **d**) 55·1092 days, we have, as the age of the moon's anomaly at the first new moon in the solar year A.D. 484, 4·499 days.

54. We have now to carry on these reckonings to the 12th tithi of Āshādha month, for which purpose we have to add (1) 59·0612 days according to section **b** of the Eye-table for Āshādha month, (2) 11·8122 days for the ending moment of the 12th tithi according to section **d** of the Eye-table, and (3) 3·952 days (section **c** of the Eye-table) *plus* 11·8122 days for the increase of the moon's anomaly from first new moon in the solar year to the 12th tithi in Āshādha month. The English equivalent of the date of the mean tithi we are in search of is given by March 18·22123 (the commencement of the Indian solar year A.D. 484-85—sections **k** and **n**) *plus* 24·38999 days (interval between commencement of solar year and first new moon in solar year—sections **l** and **o**) *plus* 70·8734 days (interval between first new moon in solar year and 12th tithi of bright half of Āshādha month—sections **b** and **d**) = March 113·4846, which by section **q** of the Eye-table is equal to ·4846 day on June 21 A.D. 484. The sun's anomaly at the ending moment of the mean tithi that we are in search of is given by 24·3899 days (interval between the commencement of the solar year and first new moon—columns **l** and **o**) *plus* 70·8734 days (interval between first new moon in solar year and end of 12th tithi of bright half of Āshādha month—section **y** or sections **b** and **d**) = 95·2633 days. According to the extended (four decimal places) sun's anomaly table in the Sūrya siddhanta Eye-table, section **h** (p. 177), the equation for a sun's anomaly of 95·26 days is — ·0454 day. The moon's anomaly at the mean ending moment of the 12th tithi of the bright fortnight of Āshādha month is given by 4·499 days (the quantity already arrived at for the moon's anomaly at the first new moon in the solar year according to sections **l, m, o** and **p**), *plus* 15·764 days (the increase of moon's anomaly up to Āshādha śukla or bright fortnight, 12th tithi—columns **c** and **d** of Eye-table) = 20·263 days. Before using this moon's anomaly we have to add to it algebraically the sun's equation already arrived at for the day in question, viz., — ·0454 day, and we obtain, as the net moon's anomaly for the given moment, 20·218 days. With this result we go into the moon's anomaly and equation table (four places of decimals) in the Sūrya siddhānta Eye-table, section **e** (p. 172), and find that the moon's equation for 20·218 days is + ·4138 day. We now add algebraically the sun's and moon's equations obtained from the anomaly tables, viz., — ·0454 day + ·4138 day, to the ending moment of the mean tithi in English time already arrived at, viz., March 113·4846. The net result is March 113·4846 + ·4138 — ·0454 = March 113·8530. We know from section **q** of the Eye-table that March 93 is equal to June 1, so that March 113 is equal to June 21. We know also from section **r** of the Eye-table that ·8500 of a day is equal to 51 ghatikas and ·0030 of a day is equal to 11 palas; so that ·8530 of a day is equal to 51 ghatikas and 11 palas. According to section **j** of the Eye-table, the week-day of June 21, A.D. 484, is given by the formula (2 + 0 + 3 + 21 =) 26 ÷ 7 ; the remainder in this division being 5, we know that the week-day was the 5th day of the week, or Thursday. We conclude that the ending moment of the 12th tithi of the bright fortnight of lunar Āsbadha month in the year A.D. 484 85, referred to in the Eran Pillar Inscription, was Thursday, 21st June A.D. 484, 51 ghatikas and 11 palas after mean sunrise. The week-day is found to be correct and we know the exact English month and date corresponding to the tithi in question. All these processes may be shortened a good deal when the student is familiar with the different portions of the Eye-table, but the example, thus given in detail, will satisfy him that it is possible, without any high mathematical powers, to arrive at the absolute ending moment of a tithi, correct to four places of decimals, with the aid of the Eye-table only. It may be noted, also, that the ending moment of this particular tithi, according to the different siddhāntas, has been worked out most carefully by an eminent Indian authority, the late Mr. Sankara Balakrishna Dikshit in the Introduction to Dr. J. F. Fleet's *Gupta Inscriptions* (p. 157), and the result above arrived at is exactly that reached by Mr. Dikshit at the end of a much longer process which he has only partially indicated, whereas by the present method the student is able to reach the same result finally by a known method of simple calculation. Mr. Dikshit also calculated the ending moment of the same tithi according to other siddhāntas and his results given below may be verified by the student according

to the different Eye-tables furnished in this work. They will be fully expounded in Chapter IV of this work (paragraphs 208 and 209, page 87 below).

Ending Moments of the 12th tithi, bright fortnight of Āshāḍha in A.D. 484–85—

(1) Sūrya siddhānta: A.D. 484 June 21, 51 ghatikas 11 palas after mean sunrise.

(2) First Ārya siddhānta: A.D. 484, June 21, 49 ghaṭikas 48 palas after mean sunrise.

(3) Brahma siddhānta: A.D. 484, June 21, 50 ghatikas 15 palas after mean sunrise.

(4) Siddhānta Śirōmani: A.D. 484, June 21, 53 ghaṭikas 21 palas after mean sunrise.

EYE-TABLE, SECTION **q**.—*Days counted from March* 1 *and days counted from April* 1.

55. The reader who has attentively followed the explanation of sections **k**, **l**, **m**, **n**, **o**, **p**, and the illustrations given thereunder will have seen the practical use of section **q** of the Eye-table. In arriving at the English equivalent of any Indian date, we have to count days from the commencement of the solar year. Running the eye down section **k** of any of the Eye-tables, the reader will notice that, while at the beginning of Kaliyuga the Indian solar year began on the 15th of February, by the time we come to A.D. 400, which is practically the earliest date that can possibly be verified according to the details of the Indian calendar, the Indian solar year now (i.e., in A.D. 400) commences on (1) 17th March, according to the Sūrya and Ārya siddhāntas and (2) 16th March, according to the Brahma Siddhānta and Siddhānta Śirōmaṇi. The commencement of the Indian solar year is then retarded at the rate of one day for every century until 1752, when the introduction of the New Style into the British calendar carries forward the English equivalent by 11 days at once; and from A.D. 1753 forwards, down to our time, the Indian solar year has always commenced in April. Now section **q** of the Eye-table enables us to calculate readily the English month and date corresponding to a certain number of days counted from 1st March or 1st April respectively. Example:—Given that an Indian solar year commenced on the 18th of March and that the ending moment of a particular tithi was 345·5 days from the commencement of the Indian solar year; required to know the English date. Answer:—March 18 + 345·5 = March 363·5. By section **q** of the Eye-table, March 338 = February 1; therefore March 363·5 which is 338 + 25·5 = February 1 + 25·5 = February 26·5 of the following English calendar year. In reckoning days from April 1, we have to remember that in a leap year April 336 is equal to March 1 of the following year as shown in section **q** of the Eye-table, whereas in an ordinary year April 335 is equal to March 1 of the following year. This means of course that, if there is a leap year in the year following April 1, that is in the next calendar year, then April 336 is equal to March 1 of the following year.

EYE-TABLE, SECTION **r**.—*Ghatikas and palas.*

56. This section gives the ghaṭikas and palas corresponding to the decimal parts of a day. The section is so constructed that any decimal part of a day, down to four decimal places, can be interpreted as an exact number of ghaṭikas and palas so as to give the exact equivalent in Indian time. An example of this has already been given by translating ·8530 of a day into ghaṭikas and palas (51 ghaṭikas 11 palas). It should be noted that the division of the day into 24 hours has been known in India only since the introduction of the Greek (Ptolemaic) system of astronomy and astrology, that is, since about the 5th century A.D. and that Indian time is always expressed sexagesimally, i.e., in ghaṭikas, each ghaṭika being the sixtieth part of a day, and palas, each pala being the sixtieth part of a ghaṭika. The occurrence of an allusion to "hora" either as a lagna or as the 24th part of a day furnishes, as was noted by the late Dr. Burgess in his contribution to the *Journal of the Royal Asiatic Society* (1893), intrinsic evidence that the work must be subsequent to the introduction of the Ptolemaic astronomy into India. A practical application of this observation is furnished by

the reference to the *hora* in the text of the ancient Tamil Grammar, the *Tolkāppiyam, Poruladikāram, Kalaviyal*, verse 135.

மறைந்த வொழுக்கத் தோரையு நாளுந்
துறந்த வொழுக்கங் கிழவோர்க்கில்லை.

Translation.

"In *Kalaviyal*, i.e., the pre-Āryan marriage rule,
the man is not obliged to abstain during prescribed
days and hours or lagnas (as in the Āryan rule)."

The occurrence of an allusion to the *hora* in this text shows that notwithstanding all that has been stated to the contrary, this part of the *Tolkāppiyam* could not have been composed much before the sixth century A.D.

Table VI in this work may be referred to when the reader wishes to convert any fraction of day, without loss of time, either into ghaṭikas and palas or into hours, minutes and seconds, and *vice versa*.

EYE-TABLE, SECTIONS **s, t, u**.—*Nakshatras.*

57. These sections of the Eye-table give all the information that is necessary, in addition to what has been set out already, to enable us to calculate the ending moments of nakshatras. The scheme of nakshatras is different in the Sūrya and Ārya siddhāntas from what it is by the Brahma siddhānta and Siddhānta Śirōmaṇi. In the two former siddhāntas the nakshatras have equal spaces of 13 degrees 20 minutes each, whereas in the Brahma siddhānta and Siddhānta Śirōmaṇi the nakshatra intervals are either one day, or half a day, or one and a half days, and in one case (Abhijit) one-third of a day. But the principle by which the ending moments of nakshatras are calculated is the same under all the siddhāntas; that is, each nakshatra is normally attendant on a particular tithi, and the ending moment of a nakshatra cannot be separated from the ending moment of the tithi on which it is attendant by more than a certain maximum interval. Accordingly, in section **s** of the Eye-table, under each lunar month, are given the shortest intervals between the new moon of that month and the ending moments of the various nakshatras belonging to that month. What the actual interval will be in a given year will depend on the use we make of sections **t** and **u** of the Eye-table. There is a fixed relation between the distance of the first new moon in the solar year from the commencement of that year and the interval by which the ending moment of any nakshatra during that year can be prolonged beyond the normal moment of occurrence of the nakshatra shown in section **s** of the Eye-table. In the year A.D. 1921–22 the first new moon in the solar year was 24·23 days distant from the commencement of the solar year. Supposing we want the mean ending moment at which nakshatra Uttara Phālguni (No. 12 nakshatra) ended in Phālguṇa month in the year 1921–22; section **t** of the Eye-table tells us that when the first new moon is 24 days distant from the commencement of the solar year, the nakshatra intervals throughout the year are prolonged by 0·41 day. Section **u** of the same table tells us that for ·23 of a day *added* to the 24 days we should *subtract* ·02 of a day from 0·41, that is for this particular year the nakshatra intervals shown in table **s** were all prolonged by 0·39 day. Consequently the ending moment of Uttara Phālguni nakshatra in Phālguna month A.D. 1921–22, which, according to table **s**, should occur 15·33 days after the new moon beginning Phālguṇa month, occurred in the year 1921–22 after an interval of 15·33 + 0·39 = 15·72 days from the new moon beginning Phālguṇa month. From Table II of this work, p. 276, we know that the new moon beginning Phālguṇa month in the year 1921–22 occurred on Sunday, February 26·59; so that the nakshatra Uttara Phālguṇi in that month ended on February 26·59 + 15·72 = February 42·31 = March 14·31, A.D. 1922. This was the ending moment of the *mean* nakshatra according to Sūrya siddhānta. If we wish to know the *actual* ending moment of the nakshatra, the easiest method is to ascertain the anomaly of the moon corresponding to 15·72 days from the new moon beginning Phālguṇa month. The nakshatra equation of the moon's anomaly of this moment is given by the appropriate table of nakshatra equations of the moon in the Eye-table,

section **f**, pp. 157, 158. The exact process of arriving at the actual ending moment of a nakshatra is not given here because it will be generally found advisable to use the abridged process which is indicated in the illustrative examples under each Eye-table.

EYE-TABLE, SECTIONS **v**, **w** *and* **x**.—*Shortest interval in days from new moon to ending moment of each yoga.*

58. This is the last portion of the Eye-table proper and shows how the ending moment of a *yoga* is to be calculated. The principle is the same as for nakshatras, i.e., there is a normal moment of occurrence for each yoga, determined with reference to the new moon which commences each lunar month; to this normal moment of occurrence we have to add the period of retardation determined by sections **w** and **x** of the Eye-table—only the retardations are longer in the case of yogas than in the case of nakshatras, the maximum being 4·11 days under yogas against a maximum of 2·21 days under nakshatras.

The *yoga* is not a very important element for the purposes of the epigraphist and the chronologist. The references to it in inscriptions and literary records are not many and are confined to the later centuries for which we generally have other means of verification in Vikrama and Śaka years. The yoga itself is an artificial conception in Indian astronomy, a yoga being supposed to be the joint space which would be travelled by the sun and the moon in a given period of time, supposing that these bodies travelled in opposite directions instead of, as they actually do, in the same direction. Consequently, just as the tithi or the natural elongation of the moon is the difference between the positions attained by the moon and sun at a given moment in the heavens, the yoga or the artificial combination of the two motions is the fictitious space which would be described by the sun and the moon if they were travelling from new moon to new moon in opposite directions instead of in the same direction. In the supposed case the sun and the moon together would do the 360 degrees of the ecliptic in 25·42 days, and the length of the yoga month is therefore 25·42 days. These 25·42 days are distributed among 27 yogas just as the nakshatra month of 27·33 days is distributed among 27 nakshatras, and the ending moment of each yoga is determined accordingly. A reference to a yoga in a literary work or an inscription necessarily implies that the framer of the record fixed the position of the yoga with reference to a panchāṅga, for he could not possibly have found a yoga by reference to the actual position of the sun and the moon in the actual heavens except by a circuitous process of calculation; and hence the investigation of yogas is a matter of altogether secondary importance in historical and chronological research.

EYE-TABLE, SECTION **y**.

59. For purposes of reference, since it will be frequently required in connexion with Table II, a section **y** is added to each Eye-table, showing (1) the collective duration in days from the first new moon in the solar year up to the ending moment of each tithi in every lunar month, and (2) the increase of the moon's anomaly up to the end of each mean tithi; this increase has to be added to the moon's anomaly at the first new moon in the solar year. It should be remembered, when using this section **y**, that an adhika month adds one to the number of lunar months in a year and that for instance in a year in which Āshāḍha is adhika, the collective duration up to the end of a tithi in Bhādrapada month should be looked for under Śrāvana in section **y**.

The reader should accustom himself to think of lunar months as well as of nakshatras by their number; and in a year in which No. 4 month is adhika, Śrāvana which is ordinarily No. 5 month will become No. 6 and information regarding tithis and nakshatras in that month should be looked for in sections **y** and **s** under ordinary No. 6 month (Bhādrapada). This is why every month column in the tables of nakshatras and yogas (sections **s** and **v**) is headed "ordinarily."

Whether a particular year contains an adhika month and what that month is, can always be readily ascertained from Table II (pp. 200 to 279).

CHAPTER III.—EXPOSITION OF THE ELEMENTS OF INDIAN CHRONOLOGY.

SECTION i.—*The synodical month and the Indian solar year.*

60. *Astronomical constants.*—A regular treatise on astronomy always closes with a chapter on astronomical constants, viz., those elements of calculation which are of use in predicting astronomical events. A treatise on astronomical computation must begin, not end, with astronomical constants.

61. *First astronomical constant—The moon's synodical month or lunation.*—The first astronomical constant in Hindu astronomy is the moon's synodical month of $29\frac{1}{2}$ days. The exact length of this period, according to the *Sūrya siddhānta,** is 29·530587946 days. The ancient Hindu astronomers purposely calculated this period to what we should now call nine places of decimals in order that there might be no error even after thousands of years. The period fixed by modern astronomy does not differ from the above in the first six decimal places, and as ·0000008, the actual difference, is $\frac{7}{100}$ of a second, it follows that the difference between European and Indian astronomy in 5,000 years or 61,844 synodical months may amount to 4,260 seconds or a little over 1 hour and 11 minutes. In practice the difference between the European and the Indian computation of new moons is very much less.

62. *What is a synodical month?*—A synodical month or lunation is the interval between one new moon and another. It is not the period in which the moon travels once round the earth, but the period in which the moon gains one complete revolution over the apparent or visible motion of the sun.

The moment of new moon is the moment when sun and moon have the same longitude, i.e., are at the same distance measured from a fixed point in the heavens. When once this moment is past, the moon resumes her journey at the rate of about 13 degrees a day and the sun resumes his at the rate of about one degree a day. It follows that the moon gains twelve degrees over the sun in a day and therefore she gains 360 degrees in about 30 days.

The synodical month, then, is the period during which the moon gains 360 degrees over the sun, and its exact length is 29·530587946 days.

63. *The solar year.*—The next astronomical constant to be noticed in Indian astronomy is the solar year, the length of which, according to the *Sūrya siddhānta,* is 365·258756481 days. The length of the year, according to modern astronomy, is 365·2422408 days. The Julian calendar assumed a year of 365·25 days, i.e., ·00776 of a day in excess of the correct figure To rectify this error, Pope Gregory XIII in 1582 ordered the dropping out of 10 days and the British Parliament in 1752 † similarly dropped out 11 days, and to avoid a recurrence of the error, we now drop out three leap years. out of every hundred. The year of 365·2422408 days is, however, a *tropical* year, whereas the Hindu astronomical year is an *anomalistic* ‡ year, and we should really compare the Hindu year with the modern *anomalistic* year, which we seldom hear of in practice, but the correct length of which is 365·2596296 days, being an excess of ·001 day over the Hindu year. This no doubt makes a difference of several days in the course of four or five thousand years, but as the Hindu year is essentially lunar and not solar, not much practical inconvenience is caused by the difference.

64. A *tropical* year is that which brings the *seasons* round at the same time of the year, whereas an *anomalistic* year is that which brings back the sun's *anomaly,*

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* The Sūrya siddhānta, the best known system of India astronomy, is believed to have been current in its present form since the eleventh century A.D. and is the standard for all India. Several other siddhāntas are extant, but only one of them, the first Ārya siddhānta, is of any practical importance in Southern India.

† This was the occasion when the NEW STYLE was introduced.

‡ Strictly speaking, a *sidereal* year, but the designation *anomalistic* year is more suitable at this stage in order to lead up to the sun's *anomaly*—for explanation see page 78, paragraph 178.

i.e., the rate at which he moves round the earth. This rate varies according as the sun is near to, or removed from, his perigee, i.e., the point when he is nearest the earth, and once a year the sun returns, as it were, to his old pace. This varying pace of the sun is very important for calculating the moment of new moon, as well as for calculating the moment of sunrise, and this is probably why the Hindu astronomers reckon the course of the sun by the anomalistic, instead of by the tropical, year.

65. *The decursus of the Hindu solar reckoning.*—The Sūrya siddhānta reckoning begins from the midnight between 17th and 18th February 3102 B.C., which is commonly called the beginning of *Kaliyuga.* On the morning of 18th February 3101 B.C., that is one year later, one complete Hindu solar year had run out by 6·13 a.m., i.e., at ·25875 of the day. As however the Hindu day is always reckoned from sunrise, mean sunrise for the whole of India being at 6 a.m., the first year is according to this siddhānta reckoned to have been completed at 13 minutes (or exactly ·00876 of a day) Indian time of the day, on 18th February 3101 B.C. At this moment the year 1 of Hindu chronology began. The Hindus generally reckon completed or expired years, and not current years, as the European calendar does ; and the first mean solar year of the Hindu chronology, which began on 18th February 3102 B.C., is, according to Hindu reckoning, the mean solar year 0. By adding 3101 to an English calendar year A.D. we arrive at the corresponding (expired) year of Kaliyuga. Thus the year A.D. 1910 is K.Y. 5011. For a B.C. year, the K.Y. equivalent is obtained by subtracting it from 3102, not 3101.

66. *Correspondence between A.D. and K.Y. years.*—If we reckon 365·258756481 days for every Indian year, commencing from midnight between 17 and 18 February 3102 B.C. we shall find that the commencement of 3101 K.Y. fell on 16th March, 1 B.C., at ·15379 of the day. The Sūrya siddhānta, however, anticipates the commencement of Kaliyuga 3101 by 2·1706944 days because the *true* Indian solar year 0 Kaliyuga really began 2·1707 days before the moment above assigned for its commencement. This correction is called *śodhya.* It thus happens that K.Y. 3101 commenced in 1 B.C. on 13th March at ·9831 of the day after mean sunrise (6 a.m.). From this point table II in this work will carry us on regularly through every year up to A.D. 2000.

SECTION ii.—*Fixing the moment of mean new moon.*

67. At the first moment of K.Y.* 0, according to the Sūrya siddhānta, the sun and moon had the same mean longitude, that is, the moon was *new* at that instant. At the first moment of K.Y. 1, 365·258756481 days would have passed, that is 12 synodical months, and in addition 10·891701129 days. That is, at the first moment of K.Y. 1, the moon was not new as she was at the first moment of K.Y. 0, but she was 10·89170 days old : and the first mean new moon in K.Y. 1 occurred on 29·530587946 *minus* 10·891701129 days = 18·638886817 days after the commencement of K.Y. 1. In this way in every Hindu year the first mean new moon would occur 18·63889 days later than in the previous year. In the year K.Y. 2 a mean new moon occurred 2 × 18·63889 days = 37·27778 days later than the commencement of the year, but as this period exceeds a synodical month, the *first* mean new moon in K.Y. 2 really occurred 37·27778 *less* 29·53059, that is, 7·74719 days after the commencement of the year K.Y. 2. The day of occurrence of the first mean new moon for 100 years after 0 K.Y. is given in the Eye-table, section O and we see from that table that in 100 K.Y. (mean solar year) the first mean new moon occurred 3·461164 days after the commencement of the year.

68. In 1 B.C., as may be seen from the Sūrya siddhānta Eye-table, section 1, the first mean new moon of the Hindu solar year occurred almost exactly 10 days (properly 10 days less ·0019 of a day) after the commencement of the solar year.

* i.e., at midnight between 17th and 18th February, 3102 B.C., the moment of commencement of *mean* Indian solar year 0. This moment was, for all purposes, *except one*, the commencement of Kaliyuga according to Sūrya siddhānta ; it was also the moment when all the planets, including the sun and moon, were at 0° mean longitude. The *excepted purpose* is the commencement of the *true* Indian solar year, referred to in paragraph 66.

The process of calculating the first new moon in any solar year has been explained in paragraph 53 supra.

SECTION iii. - *Sun's and moon's anomaly and actual moment of new moon.*

69. Although mean new moon occurs every 29·53059 days, the actual new moon does not recur so regularly. About the time when the moon is due to become new, she may be fast, or she may be slow, and we have to take this circumstance into consideration. Hindu astronomers have devised a table of the moon's anomaly which enables us to calculate exactly by how many degrees the moon is in advance of, or behind, her mean position at new moon or at any other time. The ordinary tables of the moon's anomaly and equation of the centre, as these constants are called, will be found in Professor Jacobi's standard article on the subject in Vol. I of the *Epigraphia Indica* and are reproduced in special tables II and III, pages 79 to 81 below. For the sake of practical convenience, the present method converts degrees into time and further calculates the anomaly for each ·001 of the equation, and the result is Eye-table, sections **e, f, g**.

70. The moon's anomaly (as explained at page 16) is determined for centuries and odd years in the same way as the *mean* moment of the first new moon is determined for every solar year. The moon completes an anomalistic month, that is, returns to a particular pace round the earth in 27·5546 days, and every year the moon's anomaly increases by 365·25875 less 13×27·5546=7·04896 days. In 100 years the anomaly increases by 16·03078 days.

71. In A.D. 1600, a correction, or *bīja*, introduced by the Hindu astronomer Ganesa Daivajna, came into operation. The effect of this *bīja* is to raise the annual increase of the moon's anomaly from 7·04896 days to 7·04898 days or by two seconds of time every year, and also to diminish the length of the anomalistic month from 27·5546 to 27·55459797 or by ·000002 days, i.e., $\frac{1}{5}$ of a second every month.

72. These figures enable us to calculate the moon's anomaly at any moment, it being assumed by Indian astronomers that at the commencement of the *true* (not mean) Indian solar year Kaliyuga 0, the age of the moon's anomaly, reckoned from perigee, was 4·7797 days by Sūrya siddhānta and first Ārya siddhānta (which is ordinarily referred to in this work as *the* Arya siddhānta) and 1·9988 days by Brahma siddhānta and Siddhānta Śiromaṇi.

73. Similar remarks apply to the sun, though of course the figures are different. As stated already at page 14, the Indian calendar assumes *in practice* that on a given date of the Indian solar year, the 0 day or the 10th day or the 100th day or the 300th day the sun's anomaly is the same, whatever year we may be dealing with, that is, if the sun's anomalistic equation can be expressed by — ·05 of a day for purposes of tithis at the 100th day of a particular year, the sun will have the same anomaly and the same anomalistic equation for tithis at the 100th day of any other year. This is also the *theory* of the first Ārya siddhānta, which is called *the* Ārya siddhānta in this work; and which lays down that at 0 Kaliyuga, i.e., at the commencement of the *mean* solar year Kaliyuga 0, the position of the sun's apogee was 78° that is, and that this is the case in all years; that is, when the sun has done $\frac{78}{360}$×365·2568 days or 79·1388 days of his course reckoned from the commencement of the *mean* solar year, or 79·1388+2·1467 days (the addition is the śodhya) from the commencement of the true solar year, he is at apogee, i.e., his anomalistic equation is then 0. Accordingly the Ārya siddhānta Eye-table in the present work states that at 81·29 days of the solar year the sun's anomalistic equation is 0·000: only it converts the subsequent equations into time according to the purpose for which the equation is required, i.e., whether for tithi or for yoga.

74. The other siddhāntas attribute a slow motion to the sun's perigee, that is they do not admit *in theory* that the sun's pace is absolutely the same at the beginning of every Indian solar year, whether mean or true, but that it varies slightly from century to century. These variations are set out in a special table

which will be explained when we come to the construction of tables (page 78 below). In practice, the anomaly tables of the sun presented in sections **g**, **h** and **i** of the Eye-table for each siddhānta are good for at least a thousand years and we have to remember that neither the Brahma siddhānta nor the Siddhānta Śiromani, the only two systems in which the motion of the sun's apogee is at all considerable, had been current for quite a thousand years when we reach the end of the epigraphical period (A.D. 1600).

75. Each anomaly table in the Eye-table, sections **e** to **i** (pages 171 to 194), is divided into four equal portions, two having additive equations and two subtractive. Each equation, as given in the table, consists of three decimal places, the first two being given in vertical columns and the third in a horizontal column. The horizontal column is not necessary when all we want to know is how many hours or how many ghaṭikas after sunrise a new moon or other tithi occurred, or a nakshatra or a yoga ended and consequently, the horizontal place of the equation, namely, its third decimal place, is omitted in the abridged Eye-table, sections **e** to **i**. On the other hand, when such a course is necessary for very accurate work, a *fourth* figure may be added to the third shown in the horizontal column by noting the difference between two successive anomalies and taking a proportional part of the difference between the corresponding equations. Thus, supposing we want the equation for a moon's anomaly of 6·04 days: the anomalies and equations next to those we want are—

☾'s An. 6·031 d.	...	☾'s An. 6·069 d.	...	Diff. ·038 d.
Eqn. —·397 d.	...	Eq. —·398 d.	...	Diff. ·001 d.

The anomaly under consideration 6·04 days = 6·031 + ·009 : the last figure is one-fourth of the difference between 6·031 and 6·069. Therefore the fourth decimal place to be added to the equation —·397 is one-fourth of 10, i.e., 2. Answer —·3972.

We should note that sometimes the *lesser anomaly has the higher equation.* Thus, supposing we require the equation for ☾'s An. 21·46 d. We note the following as the nearest anomalies :—

☾'s An. 21·447 d.	...	☾'s An. 21·485 d.	...	Diff. ·039 d.
Eqn. + ·399 d.	...	Eq. + ·398 d.	...	Diff. 001 d.

Our anomaly is more than 21·447 by ·013, which is one-third of the difference ·039. We therefore *deduct* one-third of 10 or 3 from the fourth decimal place of the equation + ·399 and obtain as the result + ·3987.

The same observations apply to solar anomalies.

76. For ordinary results, we do not require a fourth place in the equation, and we can take the nearest three place equation that we can find in the Eye-table, sections **e** to **i** and thus, by means of a simple sum in addition or subtraction, discover, without a moment's trouble, the actual from the mean moment of a tithi, nakshatra or yoga. Even then we shall be far more accurate than by any of the other rough and ready methods now in use. For stages of the anomaly, both solar and lunar, which increase or decrease very slowly and where the proportional parts are not obvious, the fourth decimal place of the equation is also given in the extended anomaly tables, pages 171 to 194.

SECTION IV.—*The solar months.*

77. The solar months of the Indian calendar are named in the opening section of the Eye-table. The Tamil names of months are practically the same as the Bengali names, but the first Bengali month *Vaiśākha* gives the name to the second Tamil month and so on, the last Bengali month *Chaitra* being the first Tamil month *Chittirai.*

Also, the Malayalam names of months are generally the same as those of the signs of the zodiac : the first two are called *Mēṭam* and *Eṭavam* instead of *Mēsham* and *Ṛishabham.*

But whether in the Tamil country or in Malabar or in Bengal, the measure of the solar months is the same. Like the solar year, each solar month ends at a *fraction of the day*, that is, at the moment when the next sankrānti takes place. For purposes of computation, the *sankrānti*, as well as the month to which it gives its name, is reckoned from the very moment at which the previous month ends. But in practice in the Tamil country, when sankrānti takes place after sunset, the next month begins next day; and when the sankrānti occurs before sunset, *that* is the first day of the next month, and the old month loses a day. Other sankrānti rules are observed in other parts of India. (See paragraph 12 *supra*.)

78. The solar months in the Indian calendar, which have 30 days each, are placed at fairly regular intervals, and the months with 31 days each, as also those with 29 days each, are arranged continuously. Thus the series is:

30	30
31	29
31	29
31	29
31	29
	29
	30

which is fairly symmetrical. Owing, however, to the working of the rule about *sankrāntis* before and after sunset, a month may have occasionally an extra day, and solar months with 32 days are not infrequent, as may be seen from the Ephemeris.

SECTION V.—*Lunar months in relation to solar months.*

79. The lunar months are the *doors* to the Indian calendar, but the solar months are the *hinges* on which the doors move. Every lunar month takes its name in Bengal from the solar month *in* which it occurs, and in the Tamil country from the *next* solar month after that in which it occurs.

80. Thus the lunar Vaiśākha *must* begin sometime in the solar Vaiśākha (Bengal) or sometime in the solar Chittirai (Tamil). The lunar month being only 29·53 days in length, there may be two new moons between the beginning and end of a solar month, and in this case *both* receive the same name, the first being called *adhika* or intercalary and the second *Nija* or true. The second is called "true" because it immediately precedes a sankrānti. *Adhika* months occur ordinarily once in three years, as may be seen from Table II (pages 200—279).

81. More rarely, that is about once or twice a century, a solar month may begin and end and no lunar month begin in the course of it and then some lunar month must be suppressed as there is no hinge on which this particular door can turn. The suppressed lunar month is said to be *kshaya* * or in defect.

82. We will now take three examples illustrating the different kinds of lunar years—(1) the year A.D. 1910–11 consisting of twelve lunar months, corresponding to as many solar months; (2) the year A.D. 1909–10 consisting of thirteen lunar months, which include an *adhika*, i.e., an extra or *intercalary* lunar month; (3) the year 1 B.C. or A.D. 0 consisting of thirteen lunar months, exhibiting two intercalary or *adhika* lunar months and one suppressed or *kshaya* lunar month: for whenever there is a kshaya month, there will ordinarily be two adhika months in the course of 12 months.

83. For the first we select the Indian year K.Y. 5011, A.D. 1910–11 and which is within our own time; for the second we select the year previous to it K.Y. 5010, A.D. 1909–10 also within our time; and for the third, because there has been no suppressed month since A.D. 1822, and there will be none till A.D. 1963, we select the first year of the Christian era, K.Y. 3101, 1 B.C., which is also the very first year entered in Table II (page 200) and will be made much use of, as a fixed year, in Chapter V on planetary chronology; unfortunately, as we shall notice in paragraph 310, page 127 below, 1 B.C. has *per se* little chronological interest except as a century year, because in all probability it was *not* the year when Christ was born; nevertheless it is an interesting year standing as it does at the parting of the ways.

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* Beginners find great difficulty in understanding *adhika* and *kshaya* months, because the idea is so utterly unlike anything in any other calendar; the examples given on the next and following pages are therefore purposely made somewhat prolix.

Scheme of months in K.Y. 5011, A.D. 1910–11—Sūrya siddhānta.

Lunar months.	A D. date and fraction of day of mean new moon.	Day and fraction of day of solar year when mean new moon occurred, also sun's anomaly for new moon.	Day and fraction of day of solar year when sankrānti occurred; names of solar months commencing at each sankrānti. S M. = Solar month.	Moon's anomaly at moment of each mean new moon. (To the ☾'s An. at first new moon of solar year add 1·976 days for each lunar month.)
	A.D. 1910. Indian solar year commences Ap 13 2080. (Tab II).		**K.Y. 5011.** Mēsha sankrānti Vaiśākha S M. ; Chittirai and Meṭam S.M. ; Solar year begins	
1. Vaiśākha ...	May 9 1214.	25·9134 (Tab II.)	30 9353 Rishabha sank Jyeshṭha S.M. ; Vaigāśi or Eṭavam S.M	0·534 (Table II.)
2. Jyeshṭha ...	June 7·6520.	55·4440	62 3555 Mithuna sank. Āshāḍha S M. ; Āni S.M.	2·510
3. Āshāḍha ...	July 7·1826.	84·9746	94·0003 Karkaṭaka sank Śrāvaṇa S.M., Ādi S.M.	4·486
4. Śrāvaṇa ...	Aug 5·7132.	114·5052	125 4755 Simha sank. Bhādrapada S.M ; Āvaṇi S M.	6·462
5. Bhādrapada.	Sep. 4 2437.	144·0357	156·4942. Kanyā sank. Āśvina S M., Puraṭṭāśi S.M.	8·438
6. Āśvina	Oct. 3 7743.	173·5663	186 9355. Tulā sank Kārttika S.M. (Beng) ; Aippaśi S M	10·414
7. Kārttika ...	Nov. 2·3049.	203 0969	216 8289 Vṛiśchika sank. Mārgaśirsha S.M., Kārttigai S.M.	12·390
8. Mārgaśīrsha.	Dec. 1·8355.	232·6275	246 3192. Dhanus sank Pausha S M., Mārgaḷi S M.	14·366
9. Pausha .	Dec 31 3661. **A.D. 1911.**	262 1581	275·6369. Makara sank Māgha S M , Tai S M.	16·342
10. Māgha ..	Jan 29 8967.	291·6887	305 0850. Kumbha sank Phālguna S M., Māsi S M	18·318
11. Phālguna ...	Feb 28 4273.	321·2193	334 9058. Mīna sank Chaitra S.M , Panguni S M.	20 294
12. Chaitra ...	Mar. 29 9579.	350 7499	365 2587. Mēsha sank. Vaiśākha S M., Chittirai S M.	22·270

N.B.—The main point to which the reader's attention should be directed in this scheme is that the lunar month following a new moon has its name determined by the fact of its occurring *before* a particular sankrānti. Thus, a lunar month commencing at any time between 0 day of the solar year and the 30·9353 day is called **Vaiśākha** ; similarly, a lunar month commencing at any time between 156·4942 days and 186 9355 days of the solar year is called **Āśvina** and so forth. The lunar month commencing before the Mēsha sankrānti is called **Chaitra.**

84. The solar year K.Y. 5011, A.D. 1910, which was a normal year, opened, as does every year, with the *Mēsha sankrānti* or arrival of the sun at the point from which Indian celestial longitudes are reckoned. We have already seen how this moment is determined, namely, by the successive addition of 365·25876 days to the first moment of the year *Kaliyuga* 0, less the *śōdhya* of 2·1707 days. The *Mēsha sankrānti* determines nearly all kinds of solar years in use in India, and it also determines directly the lunar year, since the first lunar month *Chaitra* is defined

to be that whose commencement precedes the Mēsha sankrānti and the first day of the lunar year is that on which *Chaitra Śukla* pratipad or the first tithi of the bright fortnight of Chaitra was current at sunrise. In the scheme of months in Table II and elsewhere the reader will observe that the lunar month *Chaitra* stands last, but this is only for purposes of computation, and, after all, the lunar month *Chaitra* belongs to a previous solar year, and so it may be shown last among the lunar months of that year.

The moment of *Mēsha sankrānti* marks the commencement of the solar month *Vaiśākha* in Bengal, of the solar month *Chittirai* in the Tamil country, and of the solar month *Mēṭam* in Malabar, Travancore and Cochin.

Each month begins and ends with a sankrānti, and the second and other sankrāntis are named in the order of the constellations of the zodiac, *Rishabha*, *Mithuna*, etc.

85. There is no difficulty about the lunar months in A.D. 1910–11, since the new moons and sankrāntis then occurred *alternately*, each *door* having its own *hinge* to turn on. It will be a useful exercise to calculate the actual moment of occurrence of each new moon for which purpose the anomalies are noted in columns 3 and 5.

Scheme of months in the year A.D. 1909-10, K.Y. 5010.

Lunar months.	A.D. date and fraction of day of mean new moon.	Day and fraction of day of solar year when mean new moon occurred, also sun's anomaly for new moon. Add successively, for each new moon after the first, 29 53058 days	Day and fraction of day of solar year when sankrānti occurred, names of solar months commencing at each sankrānti S.M. = Solar month	Moon's anomaly at moment of each mean new moon.	Sum of sun's and moon's equations (by Eye-table, sections **e** and **h**).
	A.D. 1909. Indian solar year commences. Ap 12·2492 (Tab. II).		**K.Y. 5010.** Mēsha sankrānti Vaiśākha S M., Chittirai or Mēṭam S M; Solar year begins.		
1. Vaiśākha.	Apr. 20·2238	7·2745 (Tab. II)	30·9353 Rishabha sank. Jyeshṭha S.M.; Vaigāsi or Eṭavam S.M.	2·401 (Tab. II).	
2. Jyeshṭha.	May 19 7543	36 8051	62·3555. Mithuna sank. Āshāḍha S.M., Ani S.M.	4 377	
3. Āshāḍha.	June 18·2849	66 3357	94·0003. Karkaṭaka sank. Śrāvana S M., Āḍi S.M	6·853	
4 } **Śrāvaṇa** {	July 17·8155	95·8668	125·4755 Simha sank Bhādrapada S.M.; Āvaṇi S M.	8·329	
5 }	Aug. 16·3461	125·3970 — ·4481 *124 9451		10·305 —·1250 (☉'s Eq.) 10·180	—·1250 — 3231 — 4481
6. Bhādrapada.	Sep. 14·8767	154·9275	156·4942. Kanyā sank Āśvina S.M, Puraṭṭāsi S.M.	12 281	
7. Āśvina ...	Oct. 14·4073	184·4581	186·9355. Tulā sank Kārttika S.M. (Beng.), Aippasi S M. (Tam.).	14·257	
8. Kārttika	Nov. 12·9379	213·9886	216·8289. Vṛiśchika sank. Mārgaśirsha S.M.; Kārttigai S M. (Tam.).	16·233	
9. Mārgaśirsha.	Dec. 12·4685	243·5192	246·3192 Dhanus sank. Pausha S.M., Mārgaḷi S.M	18·209	

* Actual moment of occurrence of new moon after allowing for equation in last column.

Scheme of months in the year A.D. 1909-10, K.Y. 5010—cont.

Lunar months.	A.D date and fraction of day of mean new moon.	Day and fraction of day of solar year when mean new moon occurred, also sun's anomaly for new moon. Add successively, for each new moon after the first, 29·53058 days.	Day and fraction of day of solar year when sankrānti occurred; names of solar months commencing at each sankrānti. S.M = Solar month.	Moon's anomaly at moment of each mean new moon.	Sum of sun's and moon's equations (by Eye-table, sections **e** and **h**).
	A.D. 1910.		**K.Y. 5010.**		
10. Pausha ...	Jan. 10·9990	273·0498	275·6369 Makara sank. Māgha S.M.; Tai S.M.	20·185	
11. Māgha ...	Feb. 9·5296	302·5804	305·0850. Kumbha sank Phālguna S.M., Māsi S M.	22 161	
12. Phālguna ...	Mar 11 0602	332·1110	334 9058 Mīna sank. Chaitra S M., Panguni S.M.	24·137	
13. Chaitra	Apr. 9 5908	361 6416	365·2587 Mesha sank Vaiśākha S M., Chittirai S.M.	26·113	

86. In this year, as in 1910–11, the lunar months, up to Śrāvana, alternate with the solar months; but between the *sankrāntis* due at 94·30003 days and 125·4755 days of the solar year, we have two mean new moons at 95·8663 days and 125·3970 days, respectively. No anomaly can carry the first of these two new moons to a moment earlier than 95·28 days of the solar year. We may satisfy ourselves by computation of the anomalies, as shown above, that the second new moon really preceded the sankrānti which occurred at 125·4755 days. In such a case both the new moons receive the same name (here *Śrāvaṇa*), the first is called *adhika Śrāvana* and the second *nija Śrāvana*. After this, the numerical order of the lunar months is disturbed, for the sixth new moon is called Bhādrapada, whereas in 1910–11, the fifth is Bhādrapada, and the remaining new moons, including Bhādrapada, alternate with the remaining sankrāntis, the total number of new moons for the year being 13 instead of 12.

87. We now pass to the third example.

Scheme of months for 1 B.C., K.Y. 3101.

Lunar months.	Date of mean new moon by Christian era and fraction of day.	Day of solar year when mean new moon occurred, also sun's anomaly. Add successively, for each new moon after the first, 29 53058 days.	Day of solar year when sankrānti occurred, also dates of commencement and end of solar months. S.M = Solar month.	Moon's anomaly at moment of new moon.	Sun's and moon's equations (by Eye-table, sections **e** and **h**).
	1 B.C. Indian solar year commences Mar 13·9831 (Table II.)		**K.Y. 3101.** Mesha sankrānti Vaiśākha S.M.; Chittirai or Meṭam S.M.		
1. Vaiśākha ...	Mar 23·98	9 99810	30 93523. Rishabha sank. Jyeshṭha S.M; Vaigāsi or Eṭavam S.M	22·736	
2. Jyeshṭha ...	Apr. 22 51	39·52869	62 3555. Mithuna sank. Āshāḍha S M.; Āni S.M.	24·712	

Scheme of months for 1 B.C., K.Y. 3101—cont.

Lunar months.	Date of mean new moon by Christian era and fraction of day.	Day of solar year when mean new moon occurred; also sun's anomaly. Add successively, for each new moon after the first, 29·53058 days.	Day of solar year when sankrānti occurred, also dates of commencement and end of solar months. S M. = Solar month.	Moon's anomaly at moment of new moon.	Sun's and moon's equations (by Eye-table, sections **e** and **h**).
	1 B.C. Indian solar year commences Mar. 13·9831 (Table II, page **24**)- *cont.*		**K.Y. 3101**—*cont*		
3. Āshāḍha ...	May 22·04	69·05928	94·0008 Karkaṭaka sank. Śrāvaṇa S M.; Ādi S M	26·688	
4. Śrāvaṇa ...	June 20·57	98·58986	125·4755. Siṁha sank Bhādrapada S M, Āvaṇi S.M.	1·109	
5. Bhādrapada.	July 20·10	128·12045	156·4942 Kanyā sank. Āśvina S.M., Puraṭṭāśi S M.	3·085	
6. 7. } **Āśvina**	Aug. 18·63 Sep 17·16	157·65101 187·18163 — ·5842 * 186·5974	186·9355 Tulā sank. Kārttika S.M; Aippaśi S.M.	5·061 7·037 — 1724	— ·1725 — ·4117 } — ·5842
8. Kārttika ...	Oct. 16·69	216·71221 — ·5155 * 216·1967	216·8289 Vṛiśchika sank. Mārgaśirsha S.M.; Kārttigai (Tam.) S.M.	6·865 9·013 — ·1290 8·884	— ·1290 — ·3865 } — ·5155
9. Mārgaśirsha.	Nov. 15·23	246·24280 — 3223 * 245·9205	246·8192 Dhanus sank. Pausha S.M; Mārgaḷi S M.	10·989 — ·0522 10·987	— ·0522 — ·2701 } — ·3228
Pausha ..	**(Kshaya)**	. ...	275·6369. Makara sank. Māgha S.M., Tai S M.		
10. Māgha ...	Dec. 14·176 **1 A.D.**	275·77839 — ·0414 * 275·7319	305·0850 Kumbha sank. Phālguṇa S.M; Māśi S.M.	2·965 + ·0892 13·004	+ ·0392 — ·0806 } — ·0414
11. Phālguna ...	Jan. 13·29	305·30398 + ·2515 305·5555	334·9053 Mīna sank. Chaitra S M; Panguni S.M.	14·941 + ·1195 15·060	+ 1195 + ·1320 } + 2515
12. 13. } **Chaitra** ...	Feb. 11·82 Mar 13·85	334·83457 * + ·4727 335·3073 364·36515	365·2587 Mesha sank. Vaiśākha S M., Chittirai or Mēṭam S.M.	16·917 + ·1687 17·085 18·893	+ 1687 + 3040 } + 4727

In this year there is nothing specially worthy of note till we reach *Āśvina*: but for that month there is an *adhika Āśvina* just as we have an *adhika Śrāvaṇa* in A.D. 1909. There is a peculiarity about *nija Āśvina* in the year 1 B.C., which we must note carefully. The mean *nija Āśvina* at 187·1816 days is not before the sankrānti at 186·9355 days, but the actual new moon, after calculation of anomalies, is found to be at 186·5974, i.e., before 186·9355 days and is therefore *nija Āśvina*, not Kārttika. Generally speaking, when a *nija* or *adhika* month is within ·6 day on either side of a sankrānti, calculation, or at least a consideration, of the anomalies is necessary before we can determine its true character.

88. Passing Āśvina in the year 1 B.C. we find that each of the subsequent mean new moons is within ·6 day of a sankrānti, and we must therefore calculate

* Day and fraction of day marking exact moment of actual new moon, after allowing for equations in last

the anomalies in order to be quite sure whether each new moon is on this or that side of a sankrānti. Having made these calculations, we find that between two sankrāntis, at 246·3192 days and 275·6369 days, there is no new moon, although there is a new moon just under six ghaṭikas (·095 days) *after* the second sankrānti. Had this new moon preceded the sankrānti ever so little, instead of following it, or had our method been inaccurate at this stage to the extent of 2 hours, the consequences we are about to state would not have followed. As it is, there is no new moon between the two sankrāntis at 246·3192 days and 275·6369 days and therefore the lunar month which has no hinge to turn on is shut; this fact is expressed by sayingthat *Pausha* lunar month is *kshaya* or suppressed.

89. How do we know that the lunar month to be suppressed is *Pausha* and not any other? Because that is the first new moon which we are unable to place *before* a sankrānti. We find that *Māgha* and *Phālguna* are each followed by a sankrānti, though a long way off, and between the sankrāntis at 334·9053 days and 365·2587 days there are again two new moons, that is to say, two Chaitras, the first of these being *adhika* and the second *nija*. Here also we note that appearances are deceptive, for the mean new moon at 334·8346 is apparently a Phālguṇa, but the calculation of the anomalies shows it to be an *adhika Chaitra*.

90. Generally (1) a *kshaya* month is preceded and followed, though not immediately, by an *adhika* month ; (2) there are, as a rule, only one or two *kshaya* months in a century ; (3) the *kshaya* months must be calculated from the mean moment by means of anomalies before we can prove them to be *kshaya* ; and (4) in the Sūrya and Ārya siddhāntas only one of three months, Mārgaśīrsha, Pausha, and Māgha, can be *kshaya*, because these are the three lunar months which turn on solar months of 29 days each.

The following table enables us to know an *adhika* month or a *kshaya* month in the Sūrya siddhānta calendar by mere inspection of the date of occurrence of the first new moon in a solar year. Similar tables can be constructed for the Ārya and Brahma siddhāntas and the Siddhānta Śiromaṇi with the aid of the figures showing the duration of the solar months according to each siddhānta :—

Names of lunar months (1)	Ending days of solar months. (2)	Periods of lunar months. (3)	Limits of adhika and kshaya months (4)
			The lunar month noted in column I will be an *adhika* month if first new moon in solar year occurs
Vaiśākha	30 83528 d.	29·53059 d	before 1·40469 d.
Jyeshṭha	62·35555 d.	59 06117 d.	,, 3 29438 d.
Āshaḍha	94·00028 d.	88·59176 d.	,, 5 40851 d.
Śrāvaṇa	125·47555 d.	118·12235 d.	,, 7·35320 d.
Bhādrapada	156 49417 d.	14 ·65293 d.	,, 8·84122 d.
Āśvina	186 93555 d.	177·18353 d.	,, 9·75201 d.
Karttika	216·62888 d.	206·71411 d.	,, 10·11475 d.
			The lunar month noted in column I will be *kshaya* if first new moon in solar year occurs
Mārgaśīrsha ...	246 31916 d.	236 24470 d.	after 10·07446 d. and before 10 11475 d.
Pausha ...	275·63694 d.	265 77529 d.	after 9·86164 d. and before 10·07447 d.
Māgha	305·08499 d.	295 30588 d	after 9·77910 d. and before 9·86164 d
			The lunar month noted in column I will be *adhika* if first new moon in solar year occurs
Phālguṇa ...	334·90527 d.	324·83647 d.	after 9 77912 d. and before 10 06880 d.
Chaitra ...	365·25875 d.	354·36705 d.	after 10 06880 d and before 10·89170 d.

N.B.—All the figures in column (4) are obtained by subtracting the corresponding figures in column (3) from hose in column (2).

91. We see that if the first new moon in a solar year occurs before 1·40469 days (the difference between 30·93528 and 29·53059) of the solar year, there will be a second new moon before the end of the first solar month Reasoning in the same manner, we see that if the first new moon in a solar year occurs after 1·40469 days, but before 3·29438 days of the solar year, there will be two new moons between the commencement of the first and second solar months, that is, there will be an *adhika* as well as a *nija Jyeshṭha*. Similar reasoning will enable us to connect the possibility of occurrence of the several *adhika* and *kshaya* months with the occurrence of the first new moon before or between the days mentioned in the fourth column. It will be a useful exercise for the reader to try and reason out for himself each line of this table. For determining *mean* intercalations and *mean* suppression, the table can be used as it stands; and taken with suitable anomalies, it is a safe and reliable guide for ascertaining true *adhika* and true *kshaya* months. The author believes that this is the first time that so simple a method has been indicated for recognizing *adhika* and *kshaya* months.

SECTION VI.—*Tithis*.

92. Tithis are in use over the whole of India for religious purposes and over the greater part of it for civil purposes also. To understand *tithis* thoroughly is to have mastered the system of the Hindu calendar. Tithis are as old as the Vedas.

93. A lunation or synodical month is divided into thirty tithis or lunar days of equal mean length. The names of tithis are familiar to all Hindus, but they are given for convenience of reference in Table I (**v**), page 198. The first fifteen tithis, corresponding to the bright half of the month, are called *śukla paksha*; and the second fifteen are called *krishna paksha* or *bahula paksha*. The last or 30th tithi is new moon or Amāvāsyā, and it is called sometimes by the name of the month of which it marks the end, and sometimes by the name of the following month. Thus the moment of Amāvāsyā which marks the beginning of Vaiśākha and which in this work is called the "Vaiśākha new moon" is the same as the ending moment of the 30th tithi of Chaitra and is usually called Chaitra Amāvāsyā. In an inscription* "Vaiśākha Amāvāsayā" usually means the Amāvāsyā at the *end* of Vaiśākha, but for convenience of computation, the first new moon in the solar year is in this work called the Vaiśākha new moon while the 30th tithi of Vaiśākha is called the Jyeshṭha new moon, and so on with the rest of the lunar months.

94. To find the mean ending moment of a particular *tithi*, it is only necessary to add the corresponding duration in days, according to Eye-table **y**, to the moment of the first new moon in the solar year, remembering that when a year contains an adhika month, as shown in Table II, the numbers of the months following the adhika month are changed.

Thus, to find the mean ending moment of the 18th tithi of Māgha lunar month, called *krishna* or *badi* (contraction for *bahula divasa*) *tritīyā* in K.Y. 5010, A.D. 1909-10, we proceed as follows:—

Moment of commencement of solar year A.D. 1910 (Table II) ...	April	12·9492
First new moon in solar year (Table II)		7·2745
As the year 1909-10 contains an adhika Śrāvana month according to Table II, we take for the total duration up to Māgha badi 3, the duration of the corresponding tithi in the next ordinary month, i.e., Phālguna *badi* 3 according to Eye-table **y**		313·02426d

(Total) April 333·2479 = February 27·2479 in the following year (by Eye-table, section **q**).

The *mean* tithi in question ended at ·2479 of the 27th day of February, A.D. 1910.

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* That is, on the *amānta* system or the system of reckoning lunar months from new moon to new moon There is also another system prevalent in certain parts of India, of reckoning the lunar months from full moon to full moon, hence called the *pūrnimānta* system On this system, which in all probability was more widely current formerly than it is now, the new moon is at the middle of a lunar month and the two halves of each month are properly designated its two *pakshas* or wings, one on either side of new moon Also, the new moon at the end of the amānta Chaitra lunar month, for instance, would, on the *pūrṇimānta* system, be properly called the "Vaiśākha new moon." As explained elsewhere, it is sometimes a difficult question whether a lunar month, referred to in an inscription, is to be understood in the *amānta* or in the *pūrṇimānta* sense. See section xvii of this Chapter, page 52.

Actual ending moment of a tithi.

95. Sections **e** and **h** of the Eye-table contain all that is necessary for determining the actual ending moment of a tithi, provided we know from Table II, (1) the mean ending moment and (2) the moon's anomaly at that moment. These quantities (1) and (2) can be extracted from the Eye-table, sections **k** to **p**, as shown in the illustrative examples under each Eye-table, but it is far easier to obtain them from Table II. Table II was designed originally for the Sūrya siddhānta (the pages relating to A.D. 500 to A.D. 1,000 having been designed for the Ārya siddhānta); but the very slight corrections necessary for determining the mean ending moments of tithis (and consequently of nakshatras and yogas), by the other siddhāntas are shown at the foot of each page of Table II.

96. The shortest method of ascertaining the actual ending moment of a tithi when Table II as well as the Eye-table is used, is as follows :—

Required the actual ending moment of śukla chaturthī (fourth tithi in bright fortnight) in lunar *Kārttika* month in A.D. 1910–11.—

Sūrya siddhānta.

(Table II)		Sun's anomaly in days.	Moon's anomaly in days.	
Commencement of solar year, 1910–11	Ap. 18·2080	..	...	
First new moon in solar year, 1910–11	25·9134	25·9134	0·535	
Duration in days from first new moon to Kārttigai su. 4 (Eye-table, Section **y**)	181·1209	181·1209	15 793	
April	220·2423	207·0343	16·328	
Equation of sun's anomaly for 207·03 days	...	...	—·1477	—·1477
			16·180	
Equation of moon's anomaly for 16·180 days	... ...	.. ..	... ...	+·2350
	+·0873	Sum of ☉'s and ☾'s equations	+·0873	
April	220·3296			

By Eye-table, section **q**, April 220 = November 6 ; and by Eye-table, section **r**, ·3296 of a day = 19 ghatikas, 47 palas. We conclude that the tithi in question ended at 19 ghatikas 47 palas after mean sunrise on 6th November, A.D. 1910. The "Indian Ephemeris, A.D. 1800—2000" gives the ending moment as ·34 of the day. When two places of decimals are sufficient for the ending moment the "shortest method" for tithis, indicated in illustrative examples under Eye-table may be used.

SECTION vii.—*Nakshatras.*

97. The system of quoting dates by nakshatras is as old as that of quoting by tithis and has prevailed in India from Vedic times. There are twenty-seven nakshatras or lunar mansions through which the moon passes in her monthly journey through the stars. In the Sūrya siddhānta the moon is supposed to spend an equal amount of time in each of the 27 nakshatras; and as the total period of the moon's journey through the stars occupies 27·32166 days, it follows that the mean duration of each nakshatra is $\frac{27{\cdot}32166}{27} = 1{\cdot}01191$ days, i.e., 1 day and nearly 18 minutes. Thus, if we know the mean ending moment of a particular nakshatra, all we have to do to find out the mean ending moment of the next nakshatra, or, for that matter, of any other nakshatra, is to add as many times 1·0119 days as there are nakshatras between the ending moment which we know and the ending moment which we wish to find out. This process is carried out in Eye-table **s**. Having found this ending moment, we have next to add or subtract the moon's

equation of time according to her anomaly at the ending moment of the nakshatra. We should remember that the sun's anomaly and the sun's equation of time do not enter into the calculation of the ending moment of nakshatras, because we are now concerned with the moon's own journey among the stars and not with the distance gained by her over the sun.

Actual ending moment of a nakshatra.

98. Sections **s**, **t** and **u** of the Eye-table, together with section **f** of the same table contain all that is necessary for determining the actual ending moment of any nakshatra, provided we know the mean ending moment of the previous new moon and the anomaly of the moon at that moment. The ordinary working is as follows, and it should be carefully noted:—

Required the ending moment of nakshatra Mūla (No. 19 Nak.) in lunar Kārttika month, A.D. 1910

SŪRYA SIDDHĀNTA.

	Days	☾'s anomaly Days
(Table II) Commencement of Indian solar year, 1910–11 ... April	13·2080 ...	0·535
First new moon in solar year	25·9134	11·856
(Eye-table **y**) days up to Kārttika new moon ...	177·1835	
Place of nakshatra Mūla in ordinary Kārttika, according to Eye-table, section **s**, is 3·9263 days after new moon. For every year, we have to make a nakshatra correction according to sections **t** and **u** of the Eye-table, corresponding to the interval of the first new moon in the solar year. This interval in the year 1910–11 A.D. being 25·9134 days (by Table II,) section **u** of the Eye-table gives us, as the correction corresponding to 9134, ·06807 + ·00025—·0683, i.e., the correction for ·91 *plus* the correction for 0034. This correction ·06832 should be subtracted from the correction for 25 days according to section **t**, i.e., 0·33888. Now 0·33888 *minus* ·06832 = ·27056. This quantity has to be added to the general nakshatra interval according to section **s**, 3·9263 days. Now 3·9263 + ·2706 = 4·1969	4·1969	4·1969
Total... April	220·5018	16·5880
The moon's anomaly for the mean ending moment of the nakshatra being 16·588 days, the equation for this anomaly by the Eye-table, section **f** is + ·2465	+ ·2465	
Total April	220·7483	

April 220 being by Eye-table, section **q**, November 6, and ·7483 of a day being by Eye-table, section **r**, 44 ghaṭikas and 55 palas, we conclude that *Mūla* nakshatra in lunar Kārttika month in A.D. 1910-11 ended at 44 ghaṭikas 55 palas after mean sunrise on 6 November 1910. The ending moment according to "Indian Ephemeris" for 1800—2000 A.D. is ·75 on 6 November 1910.

99. Nakshatras are very important in South Indian epigraphy and we shall next work out a somewhat complicated problem of ordinary occurrence, namely—

"Required to find, by Ārya siddhānta, the nakshatra, and the date of the Tamil solar month, on bahula 8th tithi (day of commencement) in Āḍi month, A.D. 756."

This particular problem possesses an intrinsic interest on account of its probable connexion with the "Alal kādai" or "Burning of Madura" in Kōvalan's famous story told in the Tamil classic *Śilappadikāram*. (See paper iii in Appendix).

In nakshatra problems we should first examine the first new moon in the solar year. By Table II the first new moon in solar year A.D. 756–57 occurred at 14·92 days of the solar year. We shall want the nakshatra correction corresponding to this period and might find it at once. By Eye-table, sections **t**, **u**, the nakshatra correction for 14·92 days = 1·16 — ·07 = 1·09 days. Āḍi or Karkaṭaka solar month lasts (by Ārya siddhānta, Eye-table, section **a**) from 93·93 days to 125·401

days of the solar year. The lunar month which must begin in this period, when there is no adhika month is Āshāḍha (see Eye-table, section **b**); and Āshāḍha in this particular year would begin 59·06+14·92 = 73·98 days later than the solar year. The interval from Āshāḍha new moon to end of bahula 7th tithi is the duration of 22 tithis or 21·66 days (Eye-table, section **d**) and about the end of these 21·66 days there would be according to Eye-table, section **s**, No. 27 Rēvatī nakshatra (20·86 + nakshatra correction already ascertained 1·09 days or 21·95 days in all). The day of solar year would then be 73·98 + 21·95 = 95·93 days (up to the end of Revatī nakshatra in Āshāḍha month). But we also see that before the end of Āḍi month which only begins at 93·93 days there may be another Rēvatī nakshatra. If so, that would be in Srāvana lunar month, in which, however, about the end of bahula 7th tithi or 21·66 days, nakshatra No. 2, Bharaṇī whose interval in this particular month is 20·67 days increased (for A.D. 756–57) by the nakshatra correction, 1·09 days, to 21·76 days, will have come to an end. We work, according to the shortest method exemplified in the Eye-table for the ending moment of 7th bahula tithi and No. 2 Bharaṇī nakshatra.

(Col. 1)	(Col 2)	(Col 3)	(Col 4)	(Col 5)	(Col 6)
			DAYS	DAYS	
(Table II) Ending moment of Śrāvaṇa new moon tithi, A D 756–57	For ending moment of tithi (6) July 2·09	First new moon, solar year	14·92	...	For ending moment of nakshatra
☉'s equation for 125·17 days = − ·01	Mean tithi end 21·66	Anomaly of first new moon in solar year		10·82	New moon (6) July 2·09
☾'s equation for 11·85 days (Col. 5) − ·012 (☉'s equation) or 11·84 days = − ·19		Add for Śrāvaṇa, bahula 7 (Eye-table, section **y**)	110·25	0·03	Nakshatra interval. 21·76
			125·17	11·85	Nakshatra equation (Col 1) − ·17
Sum of ☉'s and ☾'s equations for tithis = − ·01 − ·19 = − ·20	Tithi equation. ·20	Difference between ending moment of ba 7 tithi and No 2 nakshatra (see above) 21·76 − 21·66		= + ·10	(6) July 23·68
☾'s nakshatra equation for 11·95 days = − ·17	Actual end (6) July 23·55	Anomaly of moon at ending moment of No 2 nakshatra	.	11·95	

From Table II, we note that the Indian solar year A.D. 756–57 began on March 20·58 to which we add for beginning of Āḍi:

March 20·58
,, 93·93

March 114·51 = June 22.

According to the sankrānti rule observed in the Tamil country Āḍi must have begun not on June 22 but on June 23.

Since we have reached July 23 by the end of both nakshatra and tithi, we say that July 23 = June 53 = June 23 + 30, or 31st of Āḍi, provided that Āḍi lasted so long in the year in question.

In A.D. 756–57, the Siṁha or Āvani sankrānti would commence on March 20·58 + 125·40 = March 145·98 = July 23·98 (Eye-table, section **q**); by sankranti rule, Siṁha month would in these circumstances begin only on 24 July: so that the 23 July A.D. 756 when Śrāvaṇa bahuḷa 7 and Nakshatra Bharaṇī came to end at ·55 and ·68 respectively of the day, was a Friday and the 31st and last day of Āḍi.

100. Besides the system (followed in Sūrya and Ārya siddhāntas) of the division of the moon's path among the stars into 27 equal nakshatra spaces, there are two others, called Garga's system and Brahma's system, by which the sidereal month of 27·32166 days is divided into 27 convenient but *unequal* stages. Table I, page 199, gives the collective duration of the nakshatras according to the unequal systems. and the ending moment of each nakshatra according to either of these systems can be found by adding the corresponding collective duration to the ending moment of the last nakshatra Rēvatī, which should be first determined. For Brahma siddhānta this process is carried out in the Eye-table of that siddhānta, section **s**.

101. The following table shows the identification of the nakshatras with fixed stars by various authorities :—

Nakshatras.

Order and names of nakshatras.	Collective duration of Nakshatras (equal space).	Deities presiding over nakshatras.	identified by BURGESS with	Identified by COLEBROOKE with	Identified by BENTLEY with
	DAYS				
1 Āśvinī	1·01	Asvina ...	*Beta* Arietis ..	*Alpha* Arietis ..	*Gamma* or *Beta* Arietis.
2 Bharaṇī	2·02	Yama	*Alpha* Muscæ .	Musca .	35 Arietis
3 Kṛittikā (Tam. Kiruttigai).	3·04	Agni	23 Tauri	*Pi* Tauri	Alcyone (*Heta* Pleiadum).
4 Rohiṇī	4·05	Prajāpati	Al-Dabarân, *Alpha* Tauri.	*Alpha* Tauri ..	Aldebaran.
5 Mṛigaśirā (Tam Mirugaśiram).	5·06	Soma ..	*Lamda* Orionis .	*Lambda* Orionis ..	113, 116, 117 Tauri.
6 Ārdrā (Tam Arudra or Tiruvādirai).	6·07	Rudra .	*Alpha* Orionis (?) ..	*Alpha* Orionis ..	133 Tauri.
7 Punarvasū	7·08	Aditi ...	*Beta* Geminorum...	*Beta* Geminorum ..	Pollux
8 Pushyā (Tam Pusam).	8·09	Bṛihaspati ..	*Delta* Cancri	*Delta* Cancri ..	*Delta* Cancri.
9 Āśleshā (Tam Āyilyam).	9·11	Sarpāh ...	*Epsilon* Hydræ ..	*Alpha*, 1 and 2 Cancri.	49, 50 Cancri.
10 Maghā (Tam Magham).	10·12	Pitarah ...	Regulus ..	*Alpha* Leonis ...	Regulus.
11 Pūrva Phalgunī (Tam. Pûram)	11·13	Bhaga ..	*Delta* Leonis .	*Delta* Leonis ..	70, 71 Leonis
12 Uttara Phalgunī (Tam Uttiram).	12·14	Aryaman	Al-Sarfa, *Beta* Leonis.	*Beta* Leonis	*Beta* Leonis
13 Hasta (Tam Hastam).	13·15	Savitṛi ..	*Gamma* or *Delta* Corvi.	*Gamma* or *Delta* Corvi.	7, 8 Corvi.
14 Chitrā (Tam Chittirai).	14·17	Tvashṭṛi .	Spica Virginis ...	*Alpha* Virginis ..	Spica
15 Svāti .	15·18	Vāyu ..	Arcturus . .	*Alpha* Bootes	Arcturus.
16 Viśākhā (Tam Viśākam).	16·19	Indrāgni ...	*Iota* Libræ	*Alpha* or *Chi* Libræ	24, Libræ.
17 Anurādhā (Tam. Anusham)	17·20	Mitra ...	*Delta* Scorpionis ...	*Delta* Scorpionis ..	*Beta* Scorpionis.
18 Jyeshṭhā (Tam Keṭṭai).	18·21	Indra ..	Antares . ..	*Alpha* Scorpionis	Antares.
19 Mūla (Tam. Mûlam)	19·23	Nirṛiti .	*Lambda* Scorpionis.	*Lambda* Scorpionis.	34, 35 Scorpionis.
20 Pūrvā Āshāḍhā (Tam Purāḍām).	20·24	Āpah ..	*Delta* Sagittarii ...	*Delta* Sagittarii	*Delta* Sagittarii.
21 Uttara Ashāḍhā (Tam Uttirāḍam).	21·25	Viśvedevāh .	*Sigma* Sagittarii	*Tau* Sagittarii ...	*Phi* Sagittarii.
21-A. Abhijit*	...	Brahma ..	Al-Nasr Al-waqi', Vega	*Alpha* Lyræ ..	Vega.
22 Śravaṇa Tam (Tiruvōṇam).	22·26	Vishnu ...	Al-Nasr Al-tâir, *Alpha* Aquilæ.	*Alpha* Aquilæ ...	*Alpha* Aquilæ.
23 Sravishṭhā or Dhanishṭhā (Tam Aviṭṭam).	23·27	Vasavah ...	*Beta* Delphini .	*Alpha* Delphini	*Beta* Delphini
24 Śatabhishaj or Śatatārakā (Tam. Sadāyam).	24·29	Varuṇa ...	*Lambda* Aquarii ..	*Lambda* Aquarii ..	*Lambda* Aquarii.
25 Pūrva Bhadrapadā (Tam. Pūrāṭṭādi).	25·30	Aja Ekapād ...	*Alpha* Pegasi ...	*Alpha* Pegasi ...	*Alpha* Pegasi
26 Uttara Bhadrapadā (Tam Uttiraṭṭādi)	26·31	Ahirbudhnya.	*Gamma* Pegasi or *Alpha* Andromedæ.	*Alpha* Andromedæ	*Gamma* Pegasi.
27 Revati	27·32	Pushan ...	*Zeta* Piscium ...	*Zeta* Piscium ...	*Zeta* Piscium.

* Abhijit is not reckoned when only 27 nakshatras are spoken of.

SECTION viii.—*Yogas.*

102. As explained in paragraph 58, page 19 *supra*, a yoga is the time during which the sun and moon together accomplish 13 degrees 20 minutes of space. There are thus 27 yogas which together make 360°. The names of all the yogas

are given in Eye-table, section v, from which it will be seen that the collective duration of 27 yogas is 25·42020708 days by Sūrya siddhānta and by Brahma siddhānta, 25·42020574 days.

103. Unlike tithis and nakshatras, yogas do not represent the stages of the actual motion of any heavenly body or of a set of heavenly bodies. They are in fact the result of a mathematical rather than of an astronomical conception. If we draw a line



where $b\,a$ represents the motion of the moon in a given time and $c\,b$ the motion of the sun in the same time, it follows that $c\,a—c\,b$ is the moon's elongation or the space gained by the moon over the sun in the given time. If we regard separately the spaces travelled by the sun and the moon in this time, we might say that together they have done $c\,a + c\,b$. This $c\,a + c\,b$, then, is the yoga, while $c\,a — c\,b$ is the tithi. To derive the yoga from the tithi, we may make use of the formula

$$c\,a — c\,b + 2\,c\,b = \text{yoga}.$$

where $c\,a$ and $c\,b$ are respectively the moon's and sun's longitude, but in the present method it is far simpler to follow the Eye-table method shown below :—

Actual ending moment of a yoga.

104. Sections **v**, **w**, **x** of the Eye-table, together with sections **e** and **g** of the same table contain all that is necessary for determining the actual ending moment of a yoga, provided we know the mean ending moment of the previous new moon and the sun's and moon's anomaly at that moment, for which purpose we may use again the Eye-table, as shown in the illustrative examples appended to each Eye-table; but it is easier to extract the quantities we require from Table II as follows :—

Required the ending moment of yoga Siddhi (No. 16 yoga) in lunar *Kārttika* month in A.D. 1910-11.

The normal interval of yoga *siddhi* (No. 16) in the month in question is 12·0136 days after Kārttika new moon. For the year 1910–11 we have to lengthen this interval by a correction which depends on the interval of the first new moon in the solar year (25·9134 days by Table II). Exactly as we did in the case of a nakshatra (page 33 supra) we find from Eye-table, sections **w** and **x** the correction corresponding to 25·9134 days, i.e., 0·63061— { ·12666 / +·00047 }

—·12619   ·12619

+·5044

Adding ·5044 to the normal yoga interval 12·0136, we have 12 5180. With this result we proceed as we did for a nakshatra, remembering that sun's and moon's anomalies and equations are both necessary for yogas.

(Table II).	—	Sun's anomaly in days.	Moon's anomaly in days.	Equations.
Commencement of solar year 1910-11.	Ap. 13·2080	...	...	...
First new moon in solar year 1910–11.	25·9134	25·9134	0 535	...
Duration in days from first new moon to Kārttika new moon (Eye-table **y**)	177·1835	177·1835	11·856	
	216·3049	203·0969	14·391	...
		Sun's anomalistic equation for 203·10 days.	+·1323	☉'s +·1323
Sum of ☉'s and ☾'s eqn.	+·1984	Moon's yoga equation for	14·523 days	☾'s +·0661
	April 216·5033	...	...	+ 1984

By Eye-table section **q**, April 216 = November, 2; and by Eye-table section **r** ·5033 of a day = 30 ghaṭikas 12 palas. We conclude that yoga Siddhi in lunar Kārttika month in A.D. 1910-11 ended at 30 ghatikas 12 palas after mean sunrise on the 2nd November A.D. 1910.

105. Yogas in their astronomical sense are not very much in use at present, but certain astrological *yogas* (Amritayoga, Siddhayoga, Maraṇayoga) are much more in use, being based on combinations of nakshatras with certain week-days. These so-called *yogas* are not alluded to in the epigraphical period.

Apart from inscriptions dated in the Vikrama era, where yogas proper are freely cited, one hears of the *yoga* proper in such auspicious combinations as the following:—

Kapilashashthī, i.e., the combination of Bhādrapada krishṇa shasṭhī (in a year in which either Bhādrapada or some previous lunar month is *adhika*) with nakshatra *Rohiṇī* and yoga *Vyatīpāta* on a Tuesday. The combination is proverbially rare and supposed to be very difficult to foresee, but it can be easily predicted by means of the present method. Look in Table II for Bhādrapada mean new moon (in a year having this or some previous month as *adhika*) falling on a Wednesday, mean ending moment being less than ·50, and calculate *Rohiṇī* nakshatra and *Vyatīpāta* yoga for that month. Of course the tithi, the nakshatra, or the yoga *may* fall on Monday or Wednesday, and then there will be no *Kapilashashthī*.

N.B.—In A.D. 17, A D. 193, A.D 396, A.D. 440 .... A.D. 1513 there were *Kapilashashthīs*: none between A.D. 1840 and A.D. 2000 Let the student try A.D. 1736 and A.D. 1787.

Ardhōdaya yoga, i.e., a combination on a *Sunday* by day-time, of nakshatra *Rohiṇī*, yoga *Vyatīpāta*, and *Māgha* Amāvāsyā (i.e., the Amāvāsyā at the *end* of lunar Māghā).

Champa Shashthī, i.e., a combination on a *Sunday* or *Tuesday* of *Mārgaśīrsha* śukla shashṭhī with nakshatra *Satabhishaj* and yoga *Vaidhriti*.

Mahāmahā Varuṇī, i.e., a combination of *Phālguna* krishṇa trayodaśī with *Saturday* and nakshatra *Satabhishaj* and yoga *Śubha*.

Daśaharī, i.e., a combination in the *forenoon* of *Jyēshṭha* śukla daśamī with *Wednesday* (or *Tuesday*) and nakshatra *Hasta* and yoga *Vyatīpāta*.

Mahāśivarātri, i.e., Māgha krishna chaturdaśī combining at *midnight* with *Sunday* or *Tuesday*, nakshatra Śravaṇa and yoga *Śiva*.

SECTION IX.—*Karaṇas*.

106. The list of *karaṇas* is given in Table I. Every tithi is divided into two *karaṇas*, and the ending moment of the second of every set of two *karaṇas* coincides with the ending moment of a tithi. For the other *karaṇa* all we have to do is to add half a tithi, ·49217 day, to the last mean tithi, as well as to the corresponding solar and lunar anomalies and calculate from these data the absolute ending moment of the *karaṇa* thus:—

—	—	Sun's anomaly in days.	Moon's anomaly in days
On 27 February 1910 the mean tithi (18th) ended at	·2479 day.	320·30	12 324
For the 37th *karaṇa* (*Bava*) add .. .	·4922	·49	·492
Total ..	·7401 day.	320 79, ☉'s Eqn. + ·1501.	12·816 + ·150 = 12·966.
☾'s Equation— 0840 ..			
Sum of the equations + ·1501 — 0840 = ..	+ 0661		
	·8062 day, i.e., the *karana Bava* ended at 48 ghaṭikas 22 palas on 27 February 1910.		

107. Properly speaking, two karaṇas ought to be shown in the panchāṅga, corresponding to every tithi: but the panchāṅgas in practice mark only that karaṇa whose ending moment is 30 ghaṭikas or less from sunrise. If the tithi itself ends at 30 ghatikas or less from sunrise, the same ending moment is entered in the panchāṅgas against both tithi and karaṇa. In the above case, i.e., on 27 February 1910, the 36th karaṇa *Vishti* (called *Bhadra* in the Tamil country) will be found marked in the panchāṅgas as having the same ending moment as the tithi.

SECTION x.—*Ahas.*

108. Having discussed the five component parts of a panchānga proper, viz., *vāra, tithi, nakshatra, yoga* and *karaṇa*, it remains to notice two other entries usually found in a line with the first five, viz., the *ahas* and the *tyājyam*.

109. The *ahas* or duration of daylight is simply the normal period of daylight in India, viz., twelve hours or 30 ghaṭikas, with the corrections for sunrise and sunset, deduced according to the rules to be presently laid down. Thus, if on a particular day the sun rose at 5-25 a.m. and set at 6–20 p.m. the *ahas* would be 12 hours + 35′ + 20′ = 12 hours 55 minutes, or 32 ghaṭikas 18 palas.

SECTION xi.—*Tyājyam.*

110. The *tyājyam* (lit., portion to be abandoned for purposes of business) is a definite portion of the total duration of each *nakshatra*, which portion is considered inauspicious. If the *tyājyam*, always reckoned from the first moment of each nakshatra, ends by day, it is called a day-tyājyam, and if it ends by night, it is called a night-tyājyam, and in the latter case it is usual to deduct the *ahas* and state that the *tyājyam* ends so many ghaṭikas and palas after sunset.

111. The following are the fractional parts which are *tyājyam* for the several nakshatras:—

	Tyājyam		*Tyājyam.*
1 Aśvinī (five-sixths)	$\frac{5}{6}$	**15** Svāti (seven-thirtieths)	$\frac{7}{30}$
2 Bharaṇi (two fifths)	$\frac{2}{5}$	**16** Viśākhā (seven-thirtieths) . (Tam. Viśākam)	$\frac{7}{30}$
3 Krittikā (one-half) .. .. . (Tam. Kiruttigai)	$\frac{1}{2}$	**17** Anurādha (one-sixth) .. ... (Tam. Anusham)	$\frac{1}{6}$
4 Rohiṇī (two-thirds)	$\frac{2}{3}$	**18** Jyeshṭha (seven-thirtieths) ... ... (Tam. Keṭṭai)	$\frac{7}{30}$
5 Mrigaśiras (seven-thirtieths) (Tam. Mirugasiram)	$\frac{7}{30}$	**19** Mūlā (one-third) ... ... (Tam. Mūlam)	$\frac{1}{3}$
6 Ārdrā (seven-twentieths) (Tam. Ārudra or Tiruvadirai)	$\frac{7}{20}$	**20** Pūrva-Āshāḍhā (two-fifths) ... ... (Tam. Pūrāḍam)	$\frac{2}{5}$
7 Punarvasū (one-half)	$\frac{1}{2}$	**21** Uttara Āshāḍhā (one-third) ... .. (Tam. Uttirāḍam)	$\frac{1}{3}$
8 Pushyā (one-third) ... (Tam. Pūsam)	$\frac{1}{3}$	**22** Śravaṇa (one-sixth) .. ... (Tam Tiruvōṇam)	$\frac{1}{6}$
9 Āśleshā (eight-fifteenths) .. ... (Tam Ayilyam)	$\frac{8}{15}$	**23** Śravishṭhā or Dhanishṭhā (one-sixth). (Tam Aviṭṭam)	$\frac{1}{6}$
10 Maghā (one-half) ... ... (Tam. Magham)	$\frac{1}{2}$	**24** Śatabhishaj or Śatatāraka (three-tenths) ... ... (Tam Sadayam)	$\frac{3}{10}$
11 Pūrva Phalgunī (one-third) . ... (Tam Pūram)	$\frac{1}{3}$	**25** Pūrva-Bhadrapada (four fifteenths) ... (Tam. Pūraṭṭadi)	$\frac{4}{15}$
12 Uttara Phalguni (three-tenths) .. (Tam. Uttaram)	$\frac{3}{10}$	**26** Uttara Bhādrapadā (two-fifths) ... (Tam. Uttirattadi)	$\frac{2}{5}$
13 Hastā (eleven-thirtieths) ... ... (Tam. Hastam)	$\frac{11}{30}$	**27** Revatī (one-half)	$\frac{1}{2}$
14 Chitra (fourteen-fifteenths) . ... (Tam. Chittirai)	$\frac{14}{15}$		

N.B.—Authorities differ as to the *tyājyam* for certain of the nakshatras: for instance, Mr Śianti, the well-known publisher of Driggaṇitapanchangas, has informed the author that his tyājyams for nakshatras Nos. 13, 14, and 19 are [illegible], [illegible], and [illegible] (instead of $\frac{11}{30}$, $\frac{14}{15}$, and $\frac{1}{3}$), respectively.

112. The method of working out the *tyājyam* is simple. We take the total duration of each nakshatra from the ending moment of the previous nakshatra up to its own ending moment and cut off the *tyājyam*.

Thus, 12 July 1910, nakshatra ended Uttara Phalgunī at Madras at 51 ghaṭikas 50 palas.

On 13 July 1910, the next nakshatra Hastā ended in the same latitude at 56 ghaṭikas 30 palas.

The total duration of the nakshatra Hastā was, therefore, 64 ghaṭikas 40 palas.

The *tyājyam* for Hastā is $\frac{11}{30}$.

Now, $\frac{11}{30}$ of 64 ghaṭikas 40 palas = 11 × (2 ghaṭikas 9 palas) = 23 ghaṭikas 39 palas.

∴ The tyājyam for nakshatra Hasta ended on

12 July 1910, 51 ghaṭikas 50 palas + 23 ghaṭikas 39 palas = 13 July 1910, 15 ghaṭikas 29 palas, which was a day *tyājyam*.

Again, on 20 July 1910, nakshatra Mūla No. 19, ended at 31 ghaṭikas 56 palas.

On 21 July 1910, nakshatra Pūrva Āshādhā No. 20, ended at 35 ghaṭikas 36 palas.

∴ Total duration of Pūrva Āshādhā was 63 ghaṭikas 40 palas,

of which the *tyājyam* was $\frac{2}{5}$, i.e., 2 × (12 ghaṭikas 44 palas) = 25 ghaṭikas 28 palas.

∴ Tyājyam for Mūla ended on 20 July 1910 at 57 ghaṭikas 24 palas;

which, being night-time, we deduct the *ahas*, 31 ghaṭikas 27 palas (arrived at in accordance with subsequent rules regarding sunrise and sunset);

∴ Tyājyam ended at 25 ghaṭikas 57 palas after sunset on 20 July 1910, and was a night *tyājyam*.

SECTION xii.—*Sunrise*.

113. Time is reckoned in Indian astronomy, in the first instance, from Lankā* sunrise, and corrections are then applied so as to arrrive at the time reckoned from local sunrise. These corrections are three in number:—

(1) A correction for terrestrial longitude;
(2) A correction for equation of time;
(3) A correction for the sun's tropical longitude.

114. To understand the nature of these corrections, we shall give in popular language the astronomical theory of local time, as applied by Indian astronomers.

(1) *Correction for terrestrial longitude.*—If the sun moved uniformly along the celestial equator, all places on earth would have sunrise at exactly 6 a.m., local time. On this supposition local time for any moment of the day could be deducted from Lankā time by adding or subtracting four times as many minutes of time as there are degrees of longitude between Lanka (or Ujjain) and the given place. The longitude of Ujjain being 76° East of Greenwich, any place whose longitude is more than 76° from Greenwich has a positive correction, and any place whose longitude is less than 76° has a negative correction for terrestrial longitude. For example: the longitude of Madras being 80½° east of Greenwich, i.e., 4½° more than Ujjain, local time at Madras is obtained from Lankā time by adding 4½° × 4′ = 18 minutes of time.

N.B.—A meridian of terrestrial longitude makes a revolution of 360° in 24 hours, that is, it revolves 1° in (24 × 60 ÷ 360 =) 4 minutes. This interval of 4 minutes may be called the *time-difference* corresponding to a degree of terrestrial longitude.

The time-difference or correction for terrestrial longitude for nearly 200 important places in India (their importance being gauged by their population according to the Census Report of 1911) is given at the end of Table III. The correction is given in seconds of time which can be converted into *palas* or *vinādis* by simply dividing the correction by 24.

(2) *Correction for equation of time.*—The sun does not move uniformly throughout the year. Hence, for each day of the solar year, we have to apply a correction which depends on the day's equation of the centre. The correction for each day of the solar year on account of the equation of time may be expressed in seconds of time.

(3) *Correction for the sun's tropical longitude.*—The sun does not move along the equator, as in our first supposition, but along the ecliptic; and therefore it is only at the points where the ecliptic cuts the equator, i.e., at the moments of vernal and autumnal equinox that the first supposition holds good. At other times of the year, a correction has to be applied, depending on the sun's tropical longitude, i.e., on his distance from either equinox measured along the ecliptic.

* Lankā is an imaginary island supposed to be situated on the equator on the meridian of Ujjain, the Indian Greenwich—*vide* paragraph 20, page 5 *supra*.

115. Now, how are we to determine the sun's tropical longitude? The longitude that is given by the day of the Indian solar year is a sidereal longitude, i.e., the longitude of the sun measured from a fixed point of the ecliptic, which fixed point was the true vernal equinox about A.D. 500 or Kaliyuga 3600. Every year since then, the vernal equinox has been moving further and further away from that fixed point, and the sun's tropical longitude for any year subsequent to Kaliyuga 3600 must be found by adding to his sidereal longitude 3 degrees for every subsequent period of 200 years.* In this portion of the treatise degrees are always converted into days, and for the purpose of Sūrya siddhānta tithis, the tropical longitude for any day in any year is determined *by adding to the day of the solar year 1 day for every 64 years expired since Kaliyuga* 3740 (*A.D.* 639). Other siddhāntas give the precession as 1 day for every 60 years, which is more correct than 1 day for every 64 years.

By reckoning 3740 Kaliyuga and not 3600 Kaliyuga as the date of coincidence of the sidereal and tropical longitude, we eliminate the śodhya of 2·1707 days (Sūrya siddhānta) ; otherwise we would have to deduct the śodhya from the day of the solar year in order to arrive at the sidereal longitude and then add to the sidereal longitude so arrived at as many days as there were periods of 64 years since 3600 Kaliyuga. ($2{\cdot}1707 \times 64 = 139{\cdot}9248$, which is nearly 140.)

116. We mentioned the śodhya in a general way in paragraph 66 *supra*, and shall revert to it more fully in paragraphs 189 *et seq.* Meanwhile we may interpret the śodhya in the following manner. The sun's equation of the centre, according to Table IV-A on 0 day of the solar year, is + 2·1378 degrees, which, by Table IV-C is the sun's motion for 2·17 days. In other words, when the mean sun is at 0 day of the solar year, the actual sun has already done 2·17 days journey of his annual course. Therefore, whenever we wish to express in days the sidereal longitude of the sun, i.e., his distance from the position he occupied on 0 day of the mean solar year, we deduct the śodhya of 2·1707 days from the day of the solar year we are at.

117. For the year A.D. 1279 the tropical longitude is found by adding to the day of the solar year $\frac{1279 - 639}{64} = \frac{640}{64}$, i.e., exactly 10 days, and this addition holds good strictly for 64 years, i.e., for 32 years before and 32 years after A.D. 1279 or from A.D. 1247 to A.D. 1311. For 30 important places in India, including one for every degree of North Latitude between 8° and 35°, the total of all the three corrections for the year A.D. 1279 is given in Table III for each day of the solar year. In this table the correction for tropical longitude which applies to the year A.D. 1279 may be assumed to apply to the whole of the epigraphical period of 400 years from A.D. 1000 to 1400 (vide paragraph 1) instead of only to the period of 32 years before and after A.D. 1279. There is no great error in this assumption, but of course direct calculation may be made, if the reader so pleases, for each case under examination. Further, the same table gives the equivalence of English and Indian solar dates for all solar years which commenced on the 25th March; for other years we must make a *deduction* or *addition* according as the Indian solar year in question commenced *after* or *before* 25th March.

118. With these elementary notions on time, we are ready to work out quite accurately (according to the siddhāntas) any problem in local time. We shall work out, by way of illustrations, the somewhat formidable array of problems which are presented in Professor Jacobi's learned article in Volume II of the *Epigraphia Indica*.

(i) Kaliyuga 4128; 4 Bhādrapada (Bengal solar month); place RATNAGIRI (17° N. Lat.).

Correction (1) for terrestrial longitude ; — 34 vinādis. (We do not use this correction.)

* This is the correction for precession of equinoxes. The addition to be made to Indian sidereal longitudes on account of the precession of equinoxes is given in degrees in paragraph 229, page 94, under chapter V. "Planetary Chronology" for various epochs from A.D. 582 to A.D. 2051.

Correction (2), equation of time: for 4 Bhādrapada, i.e., the 129th day of solar year, in 17° lat. + 425 seconds.

Correction (3), tropical longitude for Kaliyuga 4128, 4 Bhādrapada: the number of days to be added to 129 is $\frac{4128-3740}{64} = \frac{388}{64} = 6$.

Now, 129 + 6 being 135, it follows that correction (3) is that for the 135th day, 17° N. Lat., i.e., + 746 seconds.

Total of the corrections (2) and (3) is + 425 + 746 = + 1171 seconds = $\frac{1171}{24}$ or 49 vinādis.

N.B.—Corrections (2)+(3) are sufficient for determining local sunrise: in this case the result "+ 49 vinādis" means that on the day in question the sun rose at Ratnagiri 49 vinādis or 20 minutes before 6 a.m. [Result arrived at by Professor Jacobi, 50 vinādis which is also 20 minutes of time.]

(ii) Kaliyuga 4325, 4 Mārgaśīrsha (Bengal solar month), SRINAGAR, latitude 34°. Correction (1): – 8 vinādis (We do not use this correction.)
Correction (2): + 487 seconds (220th day).
Correction (3): For $220 + \frac{4325-3740}{64} = 220 + \frac{585}{64} = 220 + 9 = 229$ days, the correction is = 2248 seconds.
Total of corrections (2) and (3): + 437 – 2248 sec. = — 1811 seconds = — 75 vinādis. [Professor Jacobi arrives at the result — 74 vinādis.]

(iii) Kaliyuga 4128; 7 Jyēshṭha (Bengal solar month); ALIGARH, latitude 28°. Correction (1), + 14 vinādis. (We do not use this correction.)
Correction (2), — 291 seconds (37th day).
Correction (3), + 2576 seconds (43rd day).
{ Total of corrections (2) + (3): + 2285″ = 95 vinādis (94 vinādis according to Professor Jacobi).

(iv) Kaliyuga 3585; Āshāḍha *śukla* 12 (lunar month), ERAN, 24° N. Lat. See paragraph 207, page 86 below.

119. The reader should note carefully when the total of all the *three* corrections should be used and when the total of corrections (1) and (3) will suffice. When we merely want to know by how many seconds *local* sunrise preceded or followed 6 a.m., we should simply add up the second and third corrections, for here there is no need to consider the effect of terrestrial longitude. If the total correction is positive, sunrise precedes 6 a.m.; if the total correction is negative, sunrise is later than 6 a.m. The first three examples above illustrate this aspect of the problem.

When we want to know how many seconds should be added or deducted from the ending moment of a *tithi* or *nakshatra*, of which we already know the Lankā time, i.e., the time relatively to Lankā sunrise, we should sum up all *three* corrections, and if the sum is positive we should add it to Lankā time, while if the sum is negative it should be subtracted from Lankā time.

SECTION xiii.—*Lagna*.

120. Closely analogous to the calculation of sunrise is that of the *lagna*, i.e., the portion of the ecliptic which appears at the eastern horizon at a *particular moment of the day*. At other times we might require to know the moment of the day when a *particular portion of the ecliptic* will be *lagna*. An example of the first kind of problem is—

"What is the lagna at the moment of a person's birth"?

N.B.—The portion of the ecliptic which is *lagna* or "cut" at the horizon at any given moment is ordinarily referred to as "the *lagna*."

An example of the second problem is—

"At what moment of a day, suitable for marriage, will a particular sign of the zodiac be lagna, so that the hour as well as the day most suitable for marriage may be determined"?

The best exposition of the lagna is that given by Professor Jacobi at pages 189, 190 of the *Indian Antiquary* for 1900, Volume XXIX. A slight adaptation of Professor Jacobi's rules will be necessary to suit our sunrise Table III.

121. The Rules are—

(1) Calculate the time-difference for the interval of space between the sum and the portion of the ecliptic which is lagna.

(2) Apply the necessary corrections for tropical longitude.

122. *Problem I.*—At how many *ghatikas* and *palas* after sunrise was the 165th degree of the ecliptic (i.e., the 15th degree of the sign *Kanyā*,—vide Eye-Table z) *lagna* on the 6th Jyēshtha (Bengal solar month) in Kaliyuga 4000, Latitude 20° North? By Eye-table **a** the end of 6th solar *Jyēshtha* was 30·93 + 6 = 36·93 days or nearly 37 days from the first moment of the solar year A.D. 899—900.

Now, the sidereal longitude at sunrise on any day of the solar year is found from Tables IV-C and IV-D thus—

Sun's actual Long. for 37 days of the solar year (Table IV-C)	34·32° + 1·49 = 35·82°
Deduct Sun's Long. for ·60 day (Table IV-D)	·59°
	35·23°

N.B.—We deduct ·60 on account of the commencement of the solar year according to Table II *Sūrya siddhānta*.

For the present purpose we take the nearest whole degree, i.e., 35 degrees.

The interval in space between 35° and 165° = 130°.

Now 360 degrees of the ecliptic rise above the horizon in 1 day or 60 ghaṭikas.

$\therefore$ 130 degrees ... ... $\frac{130 \times 60}{360} = 21\frac{2}{3}$ ghaṭikas

= 21 ghaṭikas 40 palas.

In other words, the 165th degree of the ecliptic was *lagna* about 21 ghaṭikas 40 palas after sunrise on the day in question.

123. Next, we proceed to apply the corrections for tropical longitude.

The difference between the tropical and sidereal longitude of the sun for the year Kaliyuga 4000 $= \frac{4000-3740}{64} = 4$ days. Now 36·93 days + 4 days = 40·93 days.

The correction for the tropical longitude of the sun is that pertaining to the 41st day in Table III, under latitude 20°, i.e., +1865 seconds.

For the correction for tropical longitude of the lagna, i.e., sidereal 165° of the ecliptic in Kaliyuga 4000 we have to determine the day when the mean sun accomplishes 165° of the ecliptic, which is determined as follows from Tables IV-C and IV-D :—

(Table IV-C) 169 days — 164·43°
(Table IV-D) ·58 day = ·57°

169·58 days = 165°

We add 4 days to 169·58 days for tropical longitude in the year Kaliyuga 4000. Total 173·58 or 174 days.

The correction for tropical longitude corresponding (in Kaliyuga 4000) to sidereal 165°, or tropical 174 days, is + 151 seconds.

We add this correction *with the sign reversed* to the first:—

+1865 − 151 = 1714 seconds = 72 palas.

Adding this correction to the approximation first arrived at, we have

21 ghaṭikas 40 palas.
+ 1 ghaṭika 12 palas

22 ghaṭikas 52 palas.

This was the moment (according to Professor Jacobi, *loc. cit.*) when the 165th degree of the ecliptic was *lagna* on the day in question.

N.B.—*Firstly*, we had to convert 165° of the ecliptic into days in order to apply Table III, which expresses the various portions of the ecliptic as days of the solar year.

Secondly, we reversed the sign of the correction in the case of the *lagna* because what we wanted was the difference between the corrections on account of the tropical longitude of the sun and of the *lagna* respectively.

124. *Second Problem.*—" What portion of the ecliptic was *lagna* on the same day at 20 ghaṭikas after sunrise ? "

We have seen that sunrise on the solar 6th Jyēshṭhā corresponds to 35° sidereal longitude.

Now, a time-difference of 20 ghaṭikas answers to an interval in space of $20 \times \frac{360}{60} = 120$ degrees.

∴ The portion of the ecliptic which was lagna at 20 ghaṭikas after sunrise was (*roughly*) 120°+35°= 155° or the 5th degree of the 6th sign *Kanyā* (vide Eye-table for the longitude corresponding to the different rāśis).

This is enough for all ordinary calculations of lagna.

If we wish to be quite accurate, we proceed as follows. The correction for tropical longitude of the sun on the day in question was, as we have seen, +1865 seconds.

The correction for the tropical longitude of the *lagna*, i.e., 155° of the ecliptic must be found by applying Tables IV-C and IV-D.

	(Table IV-C) 159 days	= 154·57°
	(Table IV-D) ·44 day	= ·43°
	159·44 days	= 155·00°
Add for tropical longitude	4 days	
	163·44 days.	

The correction for tropical longitude pertaining to the 20th degree of latitude and the 163rd day (in Kaliyuga 4000) is (by Table III)+333 seconds.

We add this *with sign reversed* to the first correction :

$$+1865-333 = +1532 = 64 \text{ palas.}$$

In other words, on the day in question, the 155th degree of the ecliptic was lagna at 20 ghaṭikas *plus* 64 palas.

We want, however, the degree of the ecliptic which was *lagna* at exactly 20 ghaṭikas after sunrise.

125. The annexed small table adapted from Prof. Jacobi's Table of *udayāsus* in Vol. I, *Ep. Ind.*, enables us to accomplish this stage of the problem.

We learn from this table that in the 20th degree of latitude the 6th sign of the zodiac (Kanyā, with which we are concerned) takes 257 seconds to rise *one* degree above the horizon.

∴ 64 palas or 1532 seconds are taken to rise $\frac{1532}{257} = 5{\cdot}9611°$

or (by Table VI) 5 degrees 57 minutes 40 seconds,

or nearly 5 degrees 58 minutes.

In other words, we should deduct 5 degrees 58 minutes from 155° in order to know which portion of the ecliptic was *lagna* at exactly 20 ghaṭikas after sunrise on the day in question.

The portion in question was 155° *minus* 5 degrees 58 minutes = 149 degrees 2 minutes, which is exactly the result arrived at by Professor Jacobi.

Time (in seconds) taken by a degree of the ecliptic to rise above the horizon.

DEGREES OF TERRESTRIAL LATITUDE FROM 8° TO 35°.

Signs of the zodiac.	Degrees of ecliptic.			8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°
I	0°—30°	XII	330°—360°	210	208	206	204	202	201	199	197	195	194	192	190	188	186
II	30—60	XI	300—330	229	227	226	224	228	221	220	218	217	215	214	212	211	206
III	60—90	X	270—300	253	253	252	252	251	251	250	250	249	248	248	247	246	249
IV	90—120	IX	240—270	263	263	264	264	265	266	266	267	267	268	269	269	270	270
V	120—150	VIII	210—240	250	251	258	254	256	257	259	260	262	263	265	266	268	269
VI	150—180	VII	180—210	238	238	239	241	243	244	246	248	250	252	254	255	257	259

Signs of the zodiac	Degrees of ecliptic.			22°	23°	24°	25°	26°	27°	28°	29°	30°	31°	32°	33°	34°	35°
I	0°—30°	XII	330°—360°	184	182	180	178	176	174	172	170	168	165	163	161	159	157
II	30—60	XI	300—330	208	206	205	203	201	199	197	196	194	192	190	188	186	184
III	60—90	X	270—300	245	244	244	243	242	242	241	240	239	238	238	237	237	236
IV	90—120	IX	240—270	271	273	273	274	274	275	275	276	277	277	278	278	279	280
V	120—150	VIII	210—240	270	272	274	276	278	279	281	283	285	287	289	291	293	295
VI	150—180	VII	180—210	261	263	265	267	269	271	273	275	278	280	282	284	286	288

126. The operation of determining the *lagna* of a particular moment (e.g., the moment of a birth), or the moment when a particular degree of the zodiac will be *lagna* (say, to make an auspicious marriage) has to be performed occasionally not only by the astrologer, but also by the enquirer who wishes to verify a statement in a time-record as to *lagna*. The rules on this subject given above are adapted from Prof. Jacobi's original article in the *Indian Antiquary*. For rapid working the following formulæ may be found useful. Let—

A = Sun's longitude at 6 a.m (Lanka).

B = interval in decimals of a day between local sunrise and actual *local* time of birth or other moment. This interval may, for practical purposes, be taken also as the change of sun's longitude corresponding to that interval; see N.B. to process (7) in first example below.

a = seconds per degree of rise (according to table supra).

T.L.S. = correction in seconds (Table III) for tropical longitude of sun at actual local sunrise.

T.L.L. = correction in seconds (Table III) for tropical longitude of approximate degree of lagna.

The approximate degree, which is lagna, = (A — B) + (B × 360°) or (A + 359 B) degrees.

The formula A + 359 B, process (11) below, is convenient for readily ascertaining the approximate lagna; and when the figure so obtained is well within a rāśi, it will be unnecessary to proceed further. For exact calculation, and when lagna is on the borders of a rāśi, we have,

$$\text{Actual lagna} = A + 359\,B^{\circ} - \frac{\text{T.L.S.} - \text{T.L.L.}}{a}$$

In order to render quite easy the performance of this operation, we shall exhibit, in detail and by means of an example, the 16 processes of which the operation consists. We propose to find the lagna of a child born at Madras at 12 noon (Standard or Indian Railway time) on 1st April 1915.

Process.	*Application.*
(1) Interval from actual local sunrise to moment of birth.	(1) The time (12 noon, standard time) should be reduced by 9 minutes for all dates subsequent to 1st July 1906, the date of introduction of *Indian standard*, or *Railway time* which is in advance of *Madras mean astronomical time* by 9 minutes. The mean astronomical time of birth was 11 hours 51 minutes after midnight; or 5 hours 51 minutes or ·2437 of a day after mean Madras sunrise. To this should be added, by Table III (for lat. 13°) *minus* 422 seconds for equation of time *plus* 351 seconds for tropical longitude = — 71 seconds = — ·0007 of a day. (*N.B.*—In order to find the tropical longitude

Process. *Application.*

for any day of the solar year for the present time, from A.D. 1840 to A.D. 1920—we should add 20 days to the number of elapsed days in the solar year and find under the given latitude in Table III the correction for tropical longitude appropriate to the resulting number of days.) The interval from actual Madras sunrise up to moment of birth was therefore 5 hours 51 minutes less 71 seconds = ·2430 of a day.

(2) Interval from Lanka sunrise to moment of birth.

This is obtained by subtracting from 5 hours 51 minutes (the given interval), the time difference due to Ujjain longitude of Madras, i.e., 18 minutes; (2) will then be 5 hours 33 minutes = ·2312 of a day.

(3) Change of sun's longitude corresponding to (1) " interval from actual sunrise to moment of birth "; use Table IV-D.

The change of sun's longitude corresponding to ·2430 of a day is (by Table IV-D of this work) ·2365 + ·0030 = ·2395 of a degree.

(4) Change of sun's longitude corresponding to (2) " interval from Lankā sunrise to moment of birth ", use Table IV-D.

The change of sun's longitude corresponding to ·2312 of a day is (by Table IV-D) ·2267 + ·0012 = ·2279 of a degree.

N.B. Processes (3) and (4) may generally be dispensed with See *N.B.* to (7) below

(5) Days and fraction of a day (Lanka time) elapsed in solar year up to moment of birth.

Take the given day of the English year (1st April) as reckoned from previous 1st April (Eye-table, section **q**) and deduct the day and fraction of day in April when the solar year 1914–15 commenced, according to Table II, i.e., April 12·2430. The given English day, April 1st, A.D. 1915, is, by Eye-table **q**, the 366th day reckoned from previous 1st April. Now, 366·2312 *minus* 13·2430 days = 352·9882 days.

(6) Longitude of sun at moment of birth.

N.B.—This is the *absolute* longitude of the sun for the moment of birth and does not depend on Lankā or any other time, though it is deduced by means of Lankā time

By Table IV-C, the mean longitude of sun for 352 days of the solar year is 344·7927°

Equation of centre for 352 days of the solar year = + 2·1717°

Longitude of sun corresponding to ·98 of day = ·9659°

Longitude of sun corresponding to ·0082 of day = ·0081°

Longitude of sun corresponding to 352·9882 days = 347·9884°

(7) Longitude of sun at actual local sunrise.

To obtain this, we simply subtract (3) from (6) ; or we shall have equally correct results by subtracting (1) from (6).

N.B.—We see that we might equally well take (1) instead of (3), and in general a fraction of a day less than unity may be used equally well as the change of sun's longitude corresponding to that fraction of day, since the sun's motion per day is nearly 1°.

347·9 *minus* ·2° = 347 70.

(8) Add to (7) as many minutes of an arc as there are years since A.D. 532 and deduct 360° if necessary. This is the addition for luni-solar precession—see Paper (ii) in Appendix; also paragraph 229, page 94 below. The exact figure according to paragraph 229 is 22·5°, but the difference between this and 23·05°, viz., ·5° does not affect process (9).

1,915 − 532 = 1,383 minutes = 23 degrees 3 minutes = 23·05°.

347·7° + 23·05 = 370·75°
— 360°

10·75°

Process.	*Application.*
(9) Convert (8) into days by Table IV E. Deduct 365·26 days *if necessary.*	10 degrees = 10·15 days. ·75 degree = ·76 day 10·8° = 10·91 days.
(10) Correction for tropical longitude of sun (Table III) appropriate to latitude of given place (Madras, lat. 13°) and days arrived at in (9)	+ 428 seconds of time.
(11) Approximate lagna.— Add the figure in (6) to 359 times the figure in (3) and deduct 360° *if necessary.*	347 9° + 359 × ·2395° = 433·9° — 360° 73·9°
(12) Add to (11) same quantity as in (8) and convert result into days by Table IV-E. Deduct 365·26 days *if necessary.*	73·9° + 23·05° = 96·95° = 98·37 days (by Table IV-E, for 90 degrees = 91·32 days. 6 degrees = 6·00 days. ·95° or 57 min. = ·96 day. 97·0° = 98·37 days.
(13) Correction for tropical longitude of approximate lagna (Table III) appropriate to latitude of given place (Madras, lat. 13°) and days arrived at in (12).	+ 1,217 seconds.
(14) From (10) deduct (13) algebraically.	+ 428 — 1,217 = — 789 seconds.
(15) Divide (14) by figure under latitude of given place in the table on page 44 and against sign of zodiac corresponding to degrees in (12).	Sign of zodiac corresponding to 97·0° of tropical longitude is IV. The figure against sign IV and under lat. 13° in the table on page 44 *supra* is 266 seconds. Now $\frac{-789}{266}$ = — 3 (approximately).
(16) Actual lagna is (11) *minus* (15) subtracted *algebraically.*	73·9° — (— 3°) = 76·9° or **17° in Mithuna rāsi.**

The above example is suited to a case in which the moment of birth is recorded in Indian Standard Time. But supposing the birth we are considering took place at 12 noon, Standard Time, on 1st April 1915 at *Vizagapatam,* where the same time is kept as at Madras, then in order to complete process (1) above, i.e., to ascertain the interval between actual local sunrise and time of birth, we should increase or decrease the interval by the difference in time between the Ujjain longitude of Madras and that of Vizagapatam as given in Table III. The interval will then be diminished by 1,804 — 1,072 = 732 seconds = 12 minutes, 12 seconds = (by Table VI) ·0084 of a day.

If, on the other hand, strict Indian usage has been followed (which is nowhere done at present, except by extra careful astrologers), and the moment of birth has been recorded as so many ghaṭikas and palas after *actual local sunrise,* this is the very thing we want for process (1), and we need not trouble to calculate it.

127. We shall now indicate the processes for the converse problem of ascertaining the rising moment of a lagna, considered suitable for an act depending on the human will, say, the performance of a marriage, the undertaking of a journey, the taking charge of a house or an appointment, etc. The processes are only ten in number. Suppose we want to fix a suitable hour so as to have a marriage, etc., performed at Vellore (lat. 13°, time diff. + 808 seconds) on 15th May 1915, in the middle of Siṁha lagna (135° sidereal longitude), then we proceed as follows:—

(1) Find longitude of sun at Lanka mean sunrise on the given day. Proceed as in the first example.	26·° + ·2 × 9·8° + 1·6° + ·4° = 26·6° + 1·96° + 1 6° + ·4° = 30·56°.
(2) Find out by how much local sunrise precedes or follows Ujjain sunrise. (Table III, lat. 13°, 33rd day for equation of time; 33 + 20 or 53rd day for tropical longitude.)	May 15th is the 33rd day of the Indian solar year at the present epoch. According to Table III the total correction for any moment at Vellore is — 348 + 1,592 + 808

Process.	*Application.*
	seconds = 2,052 seconds = 34 minutes 12 seconds = + ·0240 of a day. That is local sunrise precedes Lanka mean sunrise by ·0240 of a day.

N.B.—In section 119 supra it is stated that "when we merely want to know by how many seconds local sunrise preceded or followed 6 a.m., we should simply add up the second and third corrections." By 6 a.m. in this passage is meant (according to strict Indian usage) local 6 a.m., i.e., 6 a.m. by a clock keeping mean astronomical time *for the locality in question* (There is no such clock at present, except at astronomical observatories.) In the present case we want to know more, we want to know by how many seconds or minutes sunrise at Vellore on 15th May 1915 preceded or followed *Ujjain* or *Lanka* 6 a.m. We have in this case to take into account the first correction also, namely, that for terrestrial longitude, and we have done so in the above working. Again we took in the present case the correction for tropical longitude corresponding to the 53rd day of the year. The correct day, as shown in process (8) below, is the 52nd, but the difference will not lead to any appreciable error.

Process.	*Application.*
(3) Deduct (2) from (1) *algebraically* ... This is the longitude of the sun at actual local sunrise at Vellore on 15th May 1915.	30·56° − (+ ·024°) = 30·52°.
(4) Deduct (3) from proposed lagna, increasing the latter, *if necessary*, by 360°.	135° *minus* 30·52° = 104·48
(5) Time of approximate lagna. Divide (4) by 360.	$\frac{104·48}{360}$ = ·2902 of a day. = 17 ghatikas 25 palas, or 6 hours 58 minutes after local sunrise at Vellore.
(6) Increase (3) by 23·1° for tropical longitude as in process (8) in the first example, and convert into days by Table IV-E.	30·52° + 23·1° = 53·62 degrees. 50 degrees = 50 73 days. 3 „ = 3 0 days. ·6 „ = ·61 day. 53·6 degrees = 54·34 days.
(7) Increase (4) by 23·1° for tropical longitude of proposed lagna and convert into days by Table IV-E.	104·48° + 23·1° = 127·6°. 100 degrees = 101 5 days. 20 „ = 20·3 „ 7 „ = 7·1 „ 6 „ = ·6 day. 127·6 degrees = 129·5 days.
(8) Find from Table III for given latitude (Vellore 13°) the correction for tropical longitude appropriate to (6).	+ 1,610 seconds.
(9) Find from Table III for given latitude (Vellore 13°) the correction for tropical longitude of lagna, i e. (7).	+ 518 seconds.
(10) The actual moment of rising of the proposed lagna is {(9) *minus* (7)} added algebraically to (5).	(5) (9) − (7) 6 hrs. 58 min. + 518 sec. − 1,610 sec. = 6 hrs. 58 min. less 1,092 sec. = 6 hrs 58 min. less 18 min. 12 sec. = 6 hrs 39 min. 48 sec. = ·2776 of a day (Table VI). By Table VI, this fraction = 16 ghatikas 39 palas after local sunrise at Vellore. This was the moment suitable, *cæteris paribus*, for a marriage to be celebrated under *Siṁha* lagna (135°) at Vellore on 15th May 1915.

SECTION XIV.—*Sunset.*

128. The considerations to which we have introduced the reader in dealing with sunrise and lagna will enable him to deal also with *sunset*, which is only the supplement (in the language of geometry) of *sunrise*.

Supposing the sun is at a point of the ecliptic whose tropical longitude is 100°, then we have to consider at sunrise how long, relatively to the mean sun on the equator, the mean sun on the ecliptic takes to rise 100°, and at sunset we have to consider how long, relatively to the mean sun on the equator, the mean sun on the ecliptic takes to fall 80°.

129. Accordingly, to determine the moment of sunset by local time, we should take the sum of (1) the correction for equation of time, which is the same or

nearly the same as for sunrise, and (2) the correction for tropical longitude, which will be the supplement of the tropical longitude for sunrise. The supplement of an angle is the difference between it and 180°. In our sunrise tables, degrees are expressed as days and by Tables IV-C and IV-D 180°=184·80 days or in round figures 185 days.

130. What we have to do, therefore, to determine the second correction for sunset is to find the difference between the day of the solar year under consideration and 185 days, and take the correction for tropical longitude for the day so arrived at. If the solar day we are considering exceeds 185 days, the sign of the tropical longitude for the difference will remain unchanged: otherwise the sign should be reversed. This correction should then be added to the equation of time in order to determine the interval between sunset and 6 p.m. local time, while the total so arrived at should be added again to correction (1) adverted to in paragraph 113, i.e., the correction for terrestrial longitude, in order to arrive at the interval between 6 p.m. *Lankā* time and *local* sunset.

131. In the absence of any other standard authorities on the subject, we may compare our calculations of sunset for A.D. 1910-11 with those given in the Kumbakōnam Mutt Panchāngam, edited by Mr. Viśwanātha Śrauti, B.A.

Latitude 11° *N.* (*Tanjore*).

Date by European Calendar as well as by Tamil solar year *Sadharana* A.D. 1910	Days of solar year according to Table III	Equation of time in seconds by Tab. III under Lat. 11° for the day for solar year entered in col (2)	Supplement to trop longitude in days (i.e., difference between col (2) increased by 20 and 185 days).	Correction for trop. longitude acc to Tab. III for the supplemental day arrived at in column (4) (*sign to be reversed if necessary*)	Sum of corrections arrived at in columns (3) and (5).	Moment of sunset according to col. (6).	Sunset according to Mr Srauti's panchangam for 1910
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
						P M	P M
Chittirai 1 (Ap. 13)	1	−435″	164th day	− 22″	− 457″=− 7′	6-7	6-7
Vaigāśi 2 (May 15) .	32	−352″	133rd day	− 312″	− 664″=−11′	6-11	6-11
Āni 3 (Je 16) .	65	−147″	100th day	− 986″	−1133″=−19′	6-19	6-19
Ādi 3 (Jl. 18) ..	97	+163″	68th day	−1469″	−1306″=−22′	6-22	6-23
Āvaṇi 4 (Au. 19) . ..	129	+411″	36th day	−1168″	− 757″=−13′	6-13	6-14
Puraṭṭāsi 5 (S. 20) ...	161	+515″	4th day	− 144″	+ 371″=+ 6′	5-54	5-55
Aippaśi 6 (O 22)	192	+494″	27th day (212−185=27)	+ 969″	+1463″=+24′	5-36	5-36
Kārttigai 8 (N. 23) ...	224	+353″	59th day	+1523″	+1876″=+31′	5-29	5-30
Mārgaḷi 3 (D. 17)	249	+140″	84th day	+1278″	+1418″=+23′	5-37	5-37
Tai 21 (F. 3) A D 1911 ..	296	−268″	133rd day	+ 312″	+ 44″=+ 1′	5-59	6-1
Panguni 2 (Mr 15) A.D. 1911	337	−421″	172nd day	+ 12″	− 409″=− 7′	6-7	6-8

132. We observe (1) that sufficiently accurate results can be obtained by taking whole days instead of days and fractions of days in columns 2 and 4 supra; in other words, it is not necessary to calculate the day of the solar year with exactitude as we did for Problem I under "*Lagna*," (2) that a *positive* correction in column 6 re-appears in column 7 as a *deduction* from 6 p.m., while a *negative* correction in column 6 re-appears in column 7 as an addition to 6 p.m.

Supposing a birth took place 2 hours after sunset on 13th April 1910, the moment of birth would be 6 p.m. + 2 hours + 7′ =8–7 p.m. In this case sunset was 6–7 p.m. On the other hand, if a birth took place 2 hours after sunset on 23rd November 1910, then the correction for sunset being + 31′, the local time at which the birth took place would be 6 p.m. + 2 hrs. − 31′ = 7–29 p.m. In this case sunset was at 5–29 p.m.

SECTION XV.—*Eclipses.*

133. Eclipses are a most valuable and unerring historical record, and eclipses are freely cited in Indian historical documents. Accordingly, the date of occurrence of solar and lunar eclipses has been indicated in Table II and throughout this Ephemeris by means of the symbol ● for solar eclipses and ○ for lunar eclipses. A solar eclipse can occur only at new moon and a lunar eclipse can occur only at full moon, and as full moons are not specially indicated in Table II, every lunar eclipse is there shown merely as occurring in a particular lunar month. The actual date of a lunar eclipse can be found by working out the exact ending moment of the full-moon tithi, i.e., *panchadasī* or *paurnamī*. For this, of course, it will be necessary to add the collective duration of fifteen tithis, i.e., 14·76 days (Eye-table), to the mean moment of new moon and also to the moon's and sun's anomaly at that moment and add to, or subtract from, the mean moment of full moon the sum of the sun's and moon's equations. (See examples worked out in section 96 and Eye-table.) In the body of the Ephemeris, every eclipse, whether solar or lunar, is marked against the very day on which it occurred.

134. We may preface our observations on eclipses by the following passages from a well-known French work, first published in the 18th century, and still regarded as a standard authority on chronology, "*L'art de vérifier les dates*":—

"The magnitude of an eclipse is indicated in digits. A digit is the twelfth part of the diameter of a heavenly body: accordingly, an eclipse of four digits is one where the third part of the diameter of a heavenly body is in shadow; if one half of the diameter is in shadow, the eclipse is said to be of six digits; and if the whole of the diameter is in shadow, the eclipse is said to be of twelve digits. Further, in a total eclipse, if the part which is least in shadow is removed from the edge of the shadow by as much as two digits, these two digits are added to the twelve, and the eclipse is said to be one of fourteen digits.

135. "The duration of an eclipse of the moon is proportional to its magnitude; but it does not depend on this factor alone. We may say, in general, that a total eclipse of the moon will last at least $3\frac{1}{2}$ hours, and at most 4 hours and a few minutes. A partial eclipse above six digits may last as much as $3\frac{1}{4}$ hours or as little as $2\frac{1}{2}$ hours; it seldom goes beyond these limits. An eclipse of between three and six digits lasts between two and three hours. The duration corresponding to two digits is $1\frac{1}{2}$ hours; to one digit, one hour; to half a digit, $\frac{3}{4}$ of an hour. The duration of total obscurity in a total eclipse is from $1\frac{1}{2}$ to 2 hours.

136. "The moon has no light of her own, but reflects that received by her from the sun. Consequently, when in an eclipse the earth passes between the moon and the sun, and cuts off the rays of the sun from the moon, the latter can shed no more light on Paris than on Pekin or on Constantinople. An eclipse of the moon, therefore, commences at all points of the earth at the same instant and lasts everywhere for the same length of time. All that we need see is whether the time of a lunar eclipse falls between local sunset and sunrise, as otherwise the eclipse will not be visible.

137. "On the other hand, the sun is a self-luminous body: the moon is very much smaller than the earth: she is, in fact, a mere point in comparison with the sun. From these well-known facts it follows that in a solar eclipse, the moon passing between the earth and the sun, cannot cut off the rays of the sun from all parts of the earth, at the same instant. She casts her shadow in succession on different parts of the earth, and even the successive passage of the moon's shadow covers during a single eclipse only a small total extent of the earth's surface. Thus, journeying from west to east, a solar eclipse may first strike Spain, then France, then Germany, and then in succession the eastern countries as far as the farthest east of Asia, but the whole time Africa may remain untouched by the moon's shadow."

138. The extent of the earth's surface, affected by a solar eclipse, is therefore a matter of calculation: and an exact calculation is by no means easy to introduce into a popular work of this kind.

The book entitled *L'art de vérifier les dates* gives (1) *all* lunar eclipses and (2) *all* solar eclipses visible anywhere in the civilized world known to history, marking, by a series of ingenious conventions, the path of each solar eclipse, the regions where it is visible and the latitudes where it is central (*a*) under the fifth meridian, i.e., on the Coast of West Africa, 15° of longitude west of Paris, (*b*) under the meridian where it is noon at the moment of true conjunction, and (*c*) under the 155th meridian, i.e., in 142° longitude east of Greenwich. Other useful details, given under each eclipse, in the same valuable work, need not be reproduced here, as nothing short of a translation of the whole chapter on eclipses would give the reader an adequate idea of its contents.

139. Table II and the body of the Ephemeris exhibit *all* lunar eclipses, and it is easy for the reader to calculate the ending moment of the full moon tithi, which will enable him to know whether the eclipse could have been seen in India at the place under consideration. Likewise *all* solar eclipses have been given as in the French work, from A.D. 1 to A.D. 300, and after the latter date as a rule, eclipses which, according to the same authority, could not have been visible in India are not mentioned.

140. The points where the moon's orbit crosses the ecliptic are called the *nodes* and in order that an eclipse may occur, the opposition at the time of a lunar eclipse, or the conjunction at the time of a solar eclipse, must happen at or near a node The sun's distance from either node is therefore an important factor in determining whether an eclipse is or is not possible at a particular new or full moon. Sun's longitude Tables IV-C, IV-D and IV-E and Rāhu tables (IV-K) for centuries and odd years will enable the reader to calculate the sun's distance from either node (Rāhu is simply the Indian name for the moon's ascending node) at any moment from 1 B.C. to A.D. 2000, and by applying the following canons (adapted from Professor Jacobi's article in Volume 1 of *Epigraphia Indica*) he may determine whether a solar or a lunar eclipse is certain, doubtful, or impossible at a particular new or full moon respectively.

Solar and lunar eclipses as determined by sun's distance from node at new and full moon —

If sun's distance from node at new moon is

Between 0° and 16·2°, or between 163·8° and 180° — A SOLAR ECLIPSE IS *Certain.*
Between 16·3° and 18·9°, or between 163·7° and 161·1° — *Doubtful.*
Between 19·0° and 161·0° — *Impossible.*

If sun's distance from node at full moon is

Between 0° and 10·44°, or between 169·56° and 180° — A LUNAR ECLIPSE IS *Certain.*
Between 10·45° and 13·86°, or between 169·55° and 166·14° — *Doubtful.*
Between 13·87° and 166·13° — *Impossible.*

These canons are exhaustively dealt with in Chapter V, Section v, pages 134 to 150 and in Table IV-L of this work.

N B—For all solar and lunar eclipses in the years B.C 1207 to A.D. 2000, the standard work of reference is *Oppolzer's Kanon der Finsternisse* (*Order of eclipses*) · and it may be safely asserted that there are no trustworthy references in any literature in the world to eclipses of an earlier date than B C 1207. An attempt to expound the manner in which eclipses are calculated is, therefore, of little practical use in chronological investigation when the answer to the questions whether an eclipse was possible, and in which regions of the earth a solar eclipse was visible, may be easily obtained from Oppolzer. But occasionally one has to satisfy the public curiosity as to whether there was an eclipse on a date earlier than B.C. 1200. To the extent necessary to satisfy such curiosity, the author has furnished in Chapter V, Section v (pages 134 to 150) and in Table IV-L of the present work certain cycles of recurrence of eclipses, not hitherto generally noticed, whereby the occurrence of an eclipse in a past year, however remote, may be verified by the application of certain simple tests

SECTION xvi.—*Jovian cycles, years and months.*

Note.—For the exact calculation of Jupiter's mean or actual place at any moment see Tables V-A and V-B and the explanation of them in Chapter V *infra.*

141. A Jovian year is the period taken by Jupiter to pass through a sign of the zodiac, 30 degrees and it is somewhat less than an Indian solar year. A Jupiter's

cycle of 60 Jovian years is often met with in Indian chronology as a mode of reckoning time. Each of the years in the cycle receives a name corresponding to the name of one of the years in Table I, but while the so-called Jupiter's cycle in Table I, as used to this day in Southern India, is merely a cycle of 60 Indian solar years, the Jupiter's cycle, properly so called, which has been in use in Northern India and which is also given in Table I, is a cycle of real Jovian years.

142. Altogether three different meanings might be attached to the citation of a year of Jupiter's cycle:—

(1) A year of the southern cycle (Table I), which is merely a solar year with a Jovian *name*.

(2) A year of the northern cycle (Table I), which is the Jovian year actually completed at the *beginning* of a solar year.

(3) A year of the northern cycle (Table I), being the Jovian year actually completed at the actual *moment* we are dealing with.

The context alone must enable us to conjecture which of these meanings is to be attached to a citation of a Jovian year.

143. Also, where the second of the three modes of citation is followed, it is evident that if any other Jovian year has had its beginning *as well as its end* in the course of a solar year, that Jovian year will be *kshaya* or suppressed.

Hence it is that certain Jovian years are actually suppressed in the northern system of reckoning. The suppressed years are shown by blanks (......) in Table I, northern cycle.

144. *Fourth mode of citation* (4).—There is a fourth mode of citation of Jovian years which we often find in Malayālam inscriptions, and that is to cite, instead of one year out of every sixty, one year out of every twelve. In twelve Jovian years the planet Jupiter passes through the twelve signs of the zodiac and each sign corresponds to one of the twelve years of Jupiter's revolution. In a case in which Jupiter had completed nine Jovian years *, he would be described as being in the 10th sign of the zodiac, i.e., *in Makara.*

145. *Fifth mode of citation* (5).—In this the twelve Jovian years receive the names of the twelve lunar months, *Kārttika* being the first and *Aśvina* the 12th. The Jovian years † (properly, months) are distinguished from lunar months by the prefix *Mahā.* Thus, Mahā-Kārttika, Mahā-Mārgaśira, etc.

146. *Sixth mode of citation* (6).—This is the heliacal rising system, in which the Jovian cycle begins with the heliacal rising of Jupiter, i.e , his re-appearance after a conjunction with the sun. The system is exhaustively dealt with by Mr. Dikshit in his introduction to Volume III of Dr. Fleet's *Corpus Inscriptionum Indicarum*, and all the citations of this kind, hitherto found in inscriptions, are there collected.

147. Readers in Southern India will be mainly interested in the 1st and 4th modes of citation, of which the latter is otherwise called the "mean-sign system" † and which is met with in Travancore inscriptions, e.g., those discussed by Dr. Schram in *Indian Antiquary*, Volume XXV (1896), pages 9—11 ; and by Professor Kielhorn at pages 53, 174 *ibid.*

We shall cite an example: "Kollam 390, Jupiter in Kumbha, and the sun 18 days old in Mīna, THURSDAY, Pushya nakshatra, 10th lunar day."

Kollam 390 is equivalent to A.D. 390 + 824 = A.D. 1214 (Indian solar year).

Eighteen days in Kumbha month means 352 days of the solar year—

		Degrees.
By Table IV Jupiter's mean longitude at beginning of A.D. 1200	was	220 10
„ „ for 14 years	is	64 86
„ „ for 352 days	is	29·25
Total ...		314·21

* "Jovian year" does not mean the period of revolution of Jupiter's orbit (which is a little less than 12 solar years) but one-twelfth of that period, which is roughly equivalent to a solar year.

† In chapter V of this work which is devoted to planetary chronology, the reader will find a direct method of calculating either the mean or the actual sign or *rāśi* occupied by Jupiter at any moment.

Now 314° is the 14th degree of Kumbha rāśi. Therefore Jupiter is rightly described as having occupied Kumbha on the date in question. If we want Jupiter's actual geocentric place on this date we refer to Table V-A where we are informed that it was the same as on the corresponding solar day of A.D. 1819 less ·2°; and according to Table V-B this position was 316°.

SECTION xvii.—*The Varttamāna, Pūrṇimānta, Amānta and Kārttikādi systems of citation.*

148. The ordinary or normal mode of citing an Indian date is by means of *gata* or 'expired' years, *amānta* months (or months beginning with the first tithi after new moon or *Amāvāsyā*), and *Chaitrādi* years (or lunar years beginning with *Chaitra*). The lunar year can begin with Chaitra only when the solar year begins with Mēsha Sankrānti. Therefore a reckoning by Chaitrādi lunar years is the same as reckoning by Mēshādi solar years.

149. Exceptional modes of citation, used at certain epochs of history, or still used in certain parts of India, are :—

Varttamāna, or current years, opposed to *gata* (expired); *Pūrṇimānta* months, beginning with the tithi after full moon; and *Kārttikādi* lunar years (or "southern" years) beginning with the lunar month *Kārttika*.

150. In the *Pūrṇimānta* system, each month beginning with a full moon is named after the next *amānta* month, but takes in the dark fortnight preceding each new moon. It is to this system that we owe the name *paksha*, lit. a wing, the dark and bright fortnights being the wings on either side of a new moon.

151. In the *Kārttikādi* lunar year system, the year beginning with lunar Kārttika takes the number of the Meshādi solar year then running, and has in common with it the five months, Lunar Kārttika to Lunar Phālguṇa.

Canons—

I. A *dark* fortnight in *n*th Amānta month is in $(n+1)$th *Pūrṇimānta* month.

II. Any month or tithi in *N*th year, expired, is in $(N+1)$th year *current*.

III. Any of the months named in the margin in *N*th year Chaitrādi, expired, is ascribed to the

(a) $(N-1)$th year *Kārttikādi, expired*, or to
(b) *N*th year, *Kārttikādi, current*.

itra.
shṭha.
āḍha.
vaṇa.
drapada.
ina.

N.B.—Conversely, any of the above months in *n*th year *Kārttikādi*, expired, is ascribed to $(n+1)$th year *Chaitrādi*, expired.

For clearness' sake, we will present these three rules under three aspects, one of which, when we are in doubt, every problem before us must assume.

First aspect.—If we have before us a dark fortnight or *bahula* tithi of the *n*th month in the *N*th year, known to be an expired year, but do not know whether the system is *amānta* or *pūrṇimānta*, we must search for the tithi both in the *n*th and the $(n-1)$th month in our ordinary (Amānta) tables.

Second aspect.—If we have before us a dark fortnight or *bahula* tithi of the *n*th month in the *N*th year, and do not know whether the month is *amānta* or *pūrṇimānta*, nor whether the year is expired or current, we must, in using our tables, look for the tithi—

(1) in the *n*th month, *N*th year, expired;
(2) in the $(n-1)$th month, *N*th year, expired;
(3) in the *n*th month, $(N-1)$th year, expired; and
(4) in the $(n-1)$th month, $(N-1)$th year, expired.

Third aspect.—If we have before us a dark fortnight or *bahula* tithi of the *n*th month (from Chaitra to Aśvina, inclusive) in the *N*th year and do not know whether the month is *amānta* or *pūrṇimānta*, or whether the year is

expired or current, *Chaitrādi* or *Kārttikādi*, we must, in using our tables, look for the tithi—

(1) in the nth month, Nth year, expired;
(2) in the $(n-1)$th month, Nth year, expired;
(3) in the nth month, $(N-1)$th year, expired;
(4) in the $(n-1)$th month, $(N-1)$th year, expired;
(5) in the nth month, $(N+1)$th year, expired; and
(6) in the $(n-1)$th month, $(N+1)$th year, expired.

N.B.—For bright fortnight or *śukla* dates in any month, no search need be made in any case in the $(n-1)$th month; and whether for bright or dark fortnight dates in the months of Kārttika to Phālguna inclusive, no search need be made in any case in $(N+1)$th year, *expired*.

Readers who prefer Professor Kielhorn's mode of stating the same rules will find them in *Indian Antiquary*, Volume XIX, page 22, or at page 402 of *Epigraphia Indica*, Volume I Any rules must be somewhat perplexing at first sight and should be carefully reasoned out by those interested in such investigations.

152. The lunar year beginning with lunar Chaitra of any solar year n is itself $(n+1)$. Thus, Chaitra 1265 may mean:—

(*a*) Lunar Chaitra at the end of current solar 1264, i.e., at the end of expired solar 1263.

(*b*) Lunar Chaitra at the end of expired solar 1264 and before the beginning of solar 1265 (expired).

(*c*) Lunar Chaitra at the end of expired solar 1265 and before the beginning of solar 1266 (expired)

This ambiguity is independent of the difference between Chaitrādi and Kārttikādi systems, and is peculiar to the lunar month Chaitra.

SECTION xviii.—*The eras now in use or met with in inscriptions.*

153. In the following summary of Indian eras, adapted from Cunningham and other authorities, we give in each case the formula whereby a year of each era, "expired" or "current" as the case may be, may be obtained from the A.D. year, also noting where the era is or was in use, and whether it is amānta or pūrnimānta, Chaitrādi or Kārttikādi and so forth.

(1) *Kaliyuga* (expired year=3102 *minus* B.C. year; A.D. year + 3101). Used all over India as a solar (Mēshādi) and luni-solar (Chaitrādi) year. The years in this era, with A.D., Śaka, and Vikrama equivalents, are indicated in Eye-table **k** from 3102 B.C. to A.D. 2000; and they are regularly given in the Ephemeris from A.D. 700 to A.D. 1999.

(2) *Saptarishi* (current year = A.D. year + 76). Mostly *current* and mostly *pūrnimānta* and *Chaitrādi*. At present in use in Kāshmir and formerly in Multan and elsewhere. Quoted generally in cycles of 100 years. Thus A.D. 1910 = Saptarshi 1986, current, quoted only as "86 Saptarshi, current." *

(3) *Vikrama era* (expired year = A.D. year + 57). Extensively used at present in Guzerat and all over Northern India, except Bengal: *Kārttikādi Amānta* in Guzerat, hence called *Southern Vikrama*; *Chaitrādi* and *Pūrnimānta* in North India, hence called *Northern Vikrama*. Other names, "Malava era"; and also simply "Samvat." The Vikrama years, expired, from A.D. 500 to A.D. 2000 are regularly shown in Table II, and from A.D. 700 to A.D. 1999 in the Ephemeris.

(4) *Śaka era* (expired year = A.D. year *minus* 78). Extensively used in India both in the past, and at present. *Mēshādi* (for solar year) and *Chaitrādi* (for luni-solar year): generally *amānta*, but *pūrnimānta* in Northern India. Śaka equivalents of Kaliyuga and Vikrama years, expired, from A.D. 500 to A.D. 2000, are regularly given in Table II, and from A.D. 700 to A.D. 1999 in the Ephemeris. Current śaka years are often quoted in inscriptions, in which case the formula is, current śaka = A.D. year *minus* 77.

* The saptarishis are supposed (by an astronomical fiction) to occupy each nakshatra for 100 years; in other words they go round the circle of the nakshatras in 2,700 years. This convention is merely equivalent to our reckoning by centuries. Thus when Varāhamihira, quoting from Garga, says that the ṛishis were in Magha (nakshatra No. 10) during the reign of Yudhishtira, he means that the epoch was removed by 7 centuries from another when the ṛishis were in Kṛittikā nakshatra, and if we suppose that the astronomical fiction of the longitudes of all heavenly bodies being 0° at 0 day in 0 year Kaliyuga, was applied to the saptarishis also, and that their 0 longitude was in Krittika (which was an ancient reckoning), the epoch referred to by Varāhamihira would be *circa* 2500 B.C. to 2400 B.C., and Varahamihira's year-date for Yudhishtira's reign is actually A.D. 78 — 2526 years=2448 B.C. See Paper (v) in the appendix "Astronomical references in the Mahābhārata."

(5) *Kollam era* (current year = A.D year *minus* 824). Used in Malabar, Cochin, and Travancore since A.D. 825. Begins in North Malabar with solar *Kanyā* and in South Malabar with *Chingam* (Siṁha); always *solar* and *current*. English equivalents for all Kollam years are regularly given in the Ephemeris.

(6) *Bengali san* (or *sen*) (current year = A.D. year *minus* 593). *Mēshādi, current solar year.* Now in use in Bengal. For A.D. 700 to A.D. 1999, B. san equivalents are regularly given in the Ephemeris, but they are given as expired years; and to find the current Bengal san, add one to the Ephemeris number.

(7) *Chedi* or *Kalachuri era* (current year = A.D. year *minus* 247), *current, Aśvinādi, pūrnimānta.*

A.D. 300 = Chedi 53 current.		A.D. 800 = Chedi 553 current.	
„ 400 = „ 153 „		„ 900 = „ 653 „	
„ 500 = „ 253 „		„ 1000 = „ 753 „	
„ 600 = „ 353 „		„ 1100 = „ 853 „	
„ 700 = „ 453 „		„ 1200 = „ 953 „	

Not now in use, but was in use under the Kalachuri kings in Western and Central India.

(8) *Gupta* (current year = A.D. year *minus* 319).

A.D. 400 = Gupta 81 current.	A.D. 600 = Gupta 281 current.
„ 500 = „ 181 „	„ 700 = „ 381 „

Not now in use. Was in use in Central India and Nepal in the centuries above indicated as *current, Chaitrādi, pūrnimānta.*

(9) *Valābhi era* (current year = A.D. year *minus* 318). *Current, Kārttikādi, amānta,* or *pūrnimānta.*

A.D. 400 = Valābhi 82 current.	A.D. 900 = Valābhi 582 current
„ 500 = „ 182 „	„ 1000 = „ 682 „
„ 600 = „ 282 „	„ 1100 = „ 782 „
„ 700 = „ 382 „	„ 1200 = „ 882 „
„ 800 = „ 482 „	„ 1300 = „ 982 „

Not now in use. Was in use in Kāṭhiavāḍ and neighbourhood in centuries above indicated.

(10) *Vilāyati year* (current year = A.D. year *minus* 592). *Kanyādi, solar, current.*

Now in use in Orissa. Months begin invariably *on* the day of sankrānti instead of the next or the third day after.

This era bears to the Bengali san pretty much the same relation that the Valābhi bore to the Gupta era.

(11) *Amli year* (current year = A.D. year *minus* 592). *Luni-solar, current.* Lunar year changes in *Bhādrapāda śukla* 12*th*, i.e., some days before, or some days after, Kanyā-sankrānti. Otherwise the same as Vilāyati. Current in Orissa. Probably bears the same relation to Vilāyati that the luni-solar year in the Telugu country bears to the solar year of the Tamil country (i.e., only new year day is different in each case).

(12) *Fasli year* (luni-solar) in Bengal, and N.W. India (current year = A.D. year *minus* 592); *pūrnimānta and lunar Aśvinādi* (i.e., it begins on pūrnimānta Āśvina, bahula pratipad); luni-solar year for Bengal, just as the Bengal san is the solar year for the same tract of country. Like all luni-solar years, the *fasli* takes the number of the next solar san. Thus, A.D. 1900 was, Bengal san 1307 current, but the luni-solar *fasli* beginning on *Āśvina krishna pratipad of* A.D. 1900 takes the number of the next Bengal san, i.e., 1308 current. Hence the formula for Bengal *fasli* is "current A.D. year *minus* 592."

(13) *Dakhan fasli* (current year = A.D. year *minus* 593) was up to A.D. 1556 when its number was 963, a Hijra year, but from that year forward it has been kept as a solar year (identical in number with Bengal san), beginning, in parts of Bombay, when the sun enters the nakshatra *Mrigaśiras*,* i.e. (now) about 7th or 8th June. The months, their periods of beginning, and number of days are the same as in the Muhammadan calendar.

(14) The *Madras fasli* year is an *agricultural, solar, tropical* year, beginning on 1st July and having no divisions of its own into months and days. Its formula is

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* By Eye-table a the sun enters nakshatra Mrigaśiras when his longitude is 53° 20′. The number of days corresponding to this (by Table IV-C) = 56. When the solar year commences (as it did in A.D. 1911) on 13th April, the sun's entry into Mrigaśiras nakshatra would be on 56 + 13 = 69 days from 1st April, i.e., on 8th June.

"Current fasli = A.D. year *minus* 590." The agricultural or revenue year from 1st July 1910 to 30th June 1911 might be expressed quite as well by the expression "Revenue year 1910–11" as by the expression "Fasli 1320." The former expression would convey better sense to most people, and the expression "Fasli year," the use of which a blind tradition has consecrated in Madras, serves no other purpose than to confuse any one who is not a village accountant or a Tahsildar. It is a chronological anomaly and will no doubt gradually drop out of use.

(15) The Mahratta *Śūr-san*, *shahūr-san* or *Arābi-san* (current year = A.D. year *minus* 599) was extensively used under the Mahratta supremacy, and is still occasionally met with. Begins, like the Dakhan fasli, when the sun enters the nakshatra Mrigaśiras.*

(16) *Harshakāla era* (current year = A.D. year *minus* 606). Was current in Muttra (*Mathura*) in Kanauj, Nepal. Harsha 94 current = A.D 700, and so on.

(17) *Nevar era* (used in Nepal from A.D. 878 to A.D. 1768), *expired*, *Kārttikādi*, *Amānta*. Formula "Nevar expired = A.D. year *minus* 879." — Nevar 21, expired = A.D. 900. Nevar 821, expired = A.D. 1700.

(18) *Chalukya era* (expired year = A.D. year *minus* 1076). This was in use only from A.D. 1079 to A.D. 1162. It followed the śaka months and pakshas. Chalukya 24 expired = A.D. 1100.

(19) *Lakshmana Sena era* : (expired year = A.D. year *minus* 1108, according to present day almanacs). Now in use in Tirhut and Mithila, but along with the śaka or Vikrama era.

Dr. Kielhorn concludes that the formula for this era was (from A.D. 1194 to A.D. 1551). "Expired Lakshmana Sena year = A.D. year *minus* 1119." According to this formula A.D. 1200 would be equivalent to Lak. Sena 81, expired. The years of this era were *expired*, *Kārttikādi*, *amānta*.

(20) *Mahratta Raja śaka era* (current year = A.D. year *minus* 1673) was established on the accession of Sivāji: the number of the year used to change every *Jyeshtha śukla trayodaśī*, which was the tithi or date of Sivāji's accession. Otherwise same as southern luni-solar amānta saka years.

(21) *Tārikhi-i-Ilāhi* (= mighty or divine era), dating from the accession of Akbar (14th February 1556), fell into disuse *temp.* Shah Jehan. Days and months were solar, without intercalations.

SECTION xix.—*Tithis in relation to festivals and* vice versa.

154. *Day on which a festival is celebrated.*—As a *tithi* generally covers a portion of two days, it sometimes happens that though for civil purposes the tithi of a day is that which is current at sunrise, yet, for religious purposes, the tithi may have to be celebrated on the previous day when it begins. When a tithi is appointed for the celebration of a feast or fast, to be kept at forenoon, midday, late afternoon, midnight, etc., it is obvious that the feast or fast must be observed on the day when the tithi covers the prescribed part of the day. The day for such purposes is divided, first of all, into five portions *between sunrise and sunset*.

(1) *Prātahkāla*, or early forenoon, 6 ghatikas from sunrise.
(2) *Sangava*, or forenoon, 6 to 12 ghaṭikas from sunrise.
(3) *Madhyāhna*, or middav, 12 to 18 ghaṭikas from sunrise.
(4) *Aparāhna*, or afternoon, 18 to 24 ghatikas from sunrise.
(5) *Sāyāhna*, or late afternoon, 24 to 30 ghaṭikas from sunrise.

(*a*) The 4 ghaṭikas before sunrise are called *arunodaya* or rise of dawn.
(*b*) The 6 ghatikas after sunset are called *pradosha* or evening.
(*c*) The 2 ghaṭikas in the middle of the night are called *niśitha*, midnight.
(*d*) A festival marked as *pūrvaviddha* is celebrated on the first day of the tithi, not on the second. A festival celebrated on the second day on which a tithi is current is said to be *pāraviddha*.

N.B.—Tithi dvayam.—Two tithis meeting, i e., one commencing and the other ending, between 18 and 24 ghaṭikas after sunrise, when a similar meeting does not take place next day.

* By Eye-table 8 the sun enters nakshatra Mrigaśiras when his longitude is 53° 20′. The number of days corresponding to this (by Table IV-C) = 56. When the solar year commences (as it did in A.D. 1911) on 13th April, the sun's entry into Mrigasiras nakshatra would be on 56 + 13 = 69 days from 1st April, i.e., on 8th June.

155. *Festivals connected with nakshatras as well as tithis.*—On the nakshatra Śravishṭhā (No. 23) in lunar Śravaṇa, the ceremony of Upākarma (Âvaṇi Aviṭṭam, is celebrated. Eye-table, section s shows that this festival would ordinarily fall about full moon in Śravaṇa. In the same manner, all festivals associated with particular *nakshatras* may be equally well connected with particular *tithis*. In Southern India, however, it is usual to connect *nakshatra* festivals with certain *solar* months in which they are celebrated ; e.g., *Panguni Uttaram* (i.e., *Uttara Phalgunī* nakshatra in the solar month called *Panguni*), *Chittirai Mūlam* (i.e., *Mūla* nakshatra in the solar month called *Chittirai*) ; *Āvani Aviṭṭam* (vide supra), etc. *Tithi* festivals are also often connected in Southern India with solar months ; and if a festival falls, for instance, on śukla panchamī in a particular solar month, and there are two śukla panchamīs in that month, the first is called *sūnya tithi* and the second only is celebrated.

Occasionally something else is required for the celebration of a feast besides the concurrence of a *tithi* and a *nakshatra* ; and there are also festivals and fasts which cannot conveniently be arranged under tithis. Such matters are arranged in the following alphabetical notes, which will be of interest to the general reader as well as to students of epigraphy.

156. *Amāvāsyā* : the Tarpaṇa or minor *Śrāddha* should be in *aparāhna*. If it occurs in *aparāhna* on two days, and is less than 60 ghaṭikas in length, it is kept on the first day ; otherwise (i.e., if of normal length or longer) on second day. If not occurring in *aparāhna* of two days, it should be kept on the first day. The same rule is observed for śrāddhas.

Śuklayajurveda.—Amāvāsyā is kept on the third day, before moonrise.

Time for yāgās (yājnya kāla).—The last fourth part of a *parva* (i.e., either amāvāsyā or paurnamī) and first three parts of pratipad are suitable as *yāgakāla*. If there is yāgakāla on two days, then the day on which the kāla is current at noon is the proper day.

Chaturdaśī (14th tithi).—Bahula chaturdaśī in *every month* is *Śivarātri*, but Māgha ba. 14 is *Mahā Śivarātri*.

Chāturmāsya dvitīyās.—Bhādrapada ba. 2 ; Āshāḍha ba. 2 ; Phālguna ba. 2 ; Kārttika ba. 2.

The *bahula dvitīyā* in Âshāḍha, Śrāvaṇa, Bhādrapada and Āśvina is called Asūnyasayana vrata and the fast is broken at moonrise.

Ekādaśī (11th tithi).—Every ekādaśī is sacred, like every amāvāsyā, and receives a special name. It is called *Vijayā* when joined with the nakshatra "Punarvasū." The following are the names of the 24 ekādaśīs : (12 in bright halves and 12 in dark halves of the 12 lunar months) :—

Month	Sukḷapaksha	Bahulapaksha.
Chaitra	Kāmadā ekādaśī	Varūthinī ekādaśī.
Vaiśākha	Mohinī do. .. .	Aparā do.
Jyēshṭha . .	Nirjalā do	Yoginī do.
Āshāḍha ...	Vishnuṣayan otsava, Śayanī or Vishnu-sayanī ekādaśī (i.e., Vishnu going to sleep).	Kāmadā do. or Kāmikā do
Śrāvaṇa	Putradā ekādaśī	Ajā do.
Bhādrapada	Vishnuparivartanotsava or Parivartinī ekādaśī (Vishnu turning on his side, called Vishnuśṛinkhala, when 11th and 12th tithis meet in nakshatra 'Śravaṇa')	Indirā do.
Āśvina	Pāsānkusa ekādaśī	Rama do
Kārttika ...	Prabodhinī ekādaśī (waking of Vishnu), Bhishma panchakavrata commences.	Utpatti do.
Mārgaśīrsha	Mokshadā ekādaśī	Saphalā do.
Pausha	Putradā ekādaśī or Mukkoṭti or Vaikunṭha ekādaśī	Shaṭṭilā do.
Māgha	Jayā ekādaśī	Vijayā do.
Phālguṇa	Āmalakī ekādaśī	Pāpamochinī ekādaśī.

(Vaishnavas).—If *daśamī* ends after 56 ghaṭikas, the fast is on *dvādaśī* day.

If on ekādaśī day, there is any part of *navamī* or *daśamī* day, then also the fast should be kept on *dvādaśī*.

If *dvādaśī* touches three days, then the fast is on the day which is wholly *dvādaśī* and pāraṇam on the next day when dvādaśī ends.

In any other case, *ekādaśī* is the fast day and dvādaśī the day of pāraṇam.

Sanyāsins and widows of all creeds observe this rule for *ekādaśī*.

(Smārthas)—Even if *dasamī* ends after 56 ghaṭikas, the fast is kept on *ekādaśī*.

If dvādaśi touches three days, Smārthas observe the first *dvādaśī* day as *ekādaśī*.

(Kāmya ekādaśi).—Those who observe ekādaśī for *kāmya* purposes (begetting children, etc) observe the Smārtha rule: those who observe ekādaśī for *mōksha* (like Sanyāsins) observe the Vaishnava rule.

If a death occurs on the day of ekādaśī fast, whether it be ekādaśī or dvādaśī tithi, then the śrāddha is on the next day. Only Mādhvas and Tengalai Vaishnavas observe this rule: Smārthas and Vadagalai Vaishnavas observe the śrāddha on ekādaśī fast day also.

Grahaṇa.—For 9 hours before commencement of a lunar eclipse, and for 12 hours before commencement of a solar eclipse, neither śrāddha nor meals are allowed: they are allowed after *mōksha*, i.e., release of the eclipsed body. On the occasion of a *grasthōdaya*, eclipse of the moon (when moon rises in an eclipsed condition), neither śrāddha nor meals are allowed during day, and after *mōksha*, performers of purnimā śrāddha must fast and perform śrāddha next day, but others may have food at night.

Grasthāsthamanam (lunar eclipse).—If the moon sets in an eclipsed condition, meals are allowed only after next moonrise, except to the performer of śrāddha, who must fast in the night and perform śrāddha next day.

According to Manu, no srāddha on account of a tithi can be performed at night, but śrāddhas on account of eclipse must be performed during the time of eclipse, even if it be at night.

Jayanti—

1. *Matsya jayanti*—Chaitra su. 5 (*aparāhna*).
2. *Kūrma jayanti*—Jyeshṭha su. 12 (*pradōsha*).
3. *Varāha jayanti*—Chaitra su. 9 (*aparāhna*).
4. *Nārasimha jayanti*—Vaiśākha su. 13 (*pradōsha*).
5. *Vāmana jayanti*—Bhādrapada su. 12 (*madhyāhna*).
6. *Parasurāma jayanti*—Vaiśākha su. 3 (between 6 and 9 p.m.).
7. *Srī Rāma jayanti*—Chaitra su. 9 (*madyāhna*).
8. *Balarāma jayanti*—Bhādrapada su. 3 (*madyāhna*).
9. *Krishna jayanti*—Srāvana b. 8 (must be current at midnight).
10. *Bauddha jayanti*, *Kalki jayanti*—Jyeshtha su. 3 (*pradōsha*).

Kalpādi—

Kūrma kalpādi—Chaitra su. 5 or Chaitra Amāvāsyā.
Pārthiva kalpādi—Vaiśākha ba. 3.
Sāvitri kalpādi—Kārttika su. 7.
Pralaya kalpādi—Mārgaśirsha su. 9.
Varāha kalpādi—Māgha su. 13.
Brahma kalpādi—Phālguna ba. 3.
} (*pūrvāhna.*)

Mādhva tīrthams and Punyadinams.—South of Madras, Mādhvas observe these commemorations as *aparāhna vyāpini* and North of Madras, they observe them as *udaya vyāpini*, because the days are days, not of birth, but of death.

These festivals are associated with lunar months and tithis, and are inserted in the general list accordingly.

Manvādi—

List of *Manvādis*—

1. Svārochisha—Āśvina su. 9.
2. Svāyambhuva—Kārttika su. 12.

3. Uttama—Chaitra su. 3.
4. Tāmasa—Bhādrapada su. 3.
5. Agnisāvarni—Srāvana Amāvāsyā.
6. Raivata—Pushya su. 11.
7. Chākshusha—Āshādha su. 10.
8. Vaivasvata—Māgha su. 7.
9. Sūryasāvarni—Bhādrapada su. 7.
10. Rudrasāvarni—Āshādha ba. 8.
11. Indrasāvarni—Kārttika ba. 8.
12. Brahmasāvarni—Phālguna *pūrnimā*.
13. Rauchyaka—Chaitra pūrnimā.
14. Bhauchya—Jyeshtha pūrnimā.

N.B.—*Manvādi* and *Yugādi*, occurring in *suklapaksha*, should be in *pūrvāhna*, i e., before noon: if they occur in *krishnapaksha*, they should lie within *aparāhna*, i e., afternoon.

Māsa Śivarātri.—Every month, ba. 14 (*pradosha* or *pūrvaviddha*) is *Śivarātri*. See *Chaturdaśī*.*

Panchadaśī (15th tithi).—A śukla 15 or pūrnimā (full moon) is called *Somavatī* when it falls on Monday and is special for donations.

It is called *chūdāmani* when it is *further* joined with an lunar eclipse.

Most pūrnimās receive special names, which are given in the general list.

Paraviddha, a tithi kept on the day on which it ends.

Pratipad (1st tithi).—The Chaitra śukla *pratipad*, i e., that which precedes the Mēsha sankrānti, is the beginning of the Hindu lunar year, new year's day (lunar) being that on which the pratipad is current at sunrise. (When there is an *adhika Chaitra*, that begins the year.) The tithi is therefore called *Vatsarārambha* (commencement of the year). It is also *Navarātrārambha*, there being another *Navarātrārambha* on *Āśvina* sukla pratipad.

Pūrvaviddha.—A tithi kept on the day on which it begins, provided it begins more than 4 ghatikas before the sunset of one day and ends before sunset of following day.

Pushkara, or festival of a river, is celebrated when Jupiter enters certain signs of the zodiac. The signs for the 12 chief rivers are—

Jupiter in	Mēsha—Gangā.	Jupiter in	Tulā—Kāveri.
,,	Rishabha—Revā.	,,	Vriśchika—Bhimarathi.
,,	Mithuna—Sarasvati.	,,	Dhanus—Pushkaram.
,,	Karkataka—Jamna.	,,	Makara—Tungabhadra.
,,	Simha—Gōdāvari.	,,	Kumbha—Indus.
,,	Kanyā—Krishna.	,,	Mīna—Sapranītantasī.

The moment of Jupiter's entry into a rāśi is the Pushkaram, and the period of the festival is 12 days.

A rāśi into which Jupiter enters twice (i e., before retrogression and after) is counted only at second entry.

N B.—For time of entry of Jupiter into the several rāśis, during the years 1024 B C. to A D. 1999 see Tables V-A and V-B

Sankramana.—When sankrānti occurs during daylight, it should be observed as closely as possible: if after sunset, it is kept on the first day in the case of sankrānti occurring before midnight: otherwise, next day. If at midnight, it may be kept on either day. Rishabha, Simha, Vriśchika, Kumbha sankrāntis (sthira rāśi sankrāntis) are called *Vishnupāda*. Mithuna, Kanyā, Dhanus, Mīna (dvisvabhāva rāśis) are called *Shadasīti punyakāla*.

Mēsha and Tulā sankrāntis are called Vishuvat punyakāla. Karkataka and Makara sankrāntis are called respectively Dakshināyana and Uttarāyana punyakāla.

Sopapadas.—Jyeshtha su. 2, Āśvina su. 10, Māgha su. 4 and 12 (*pūrvāhna*).

Tisroshtakas.—7th, 8th and 9th tithis in bahula paksha of Mārgaśīrsha, Pushya, Māgha, Phālguna (*aparāhna*).

Upākarma.—Srāvana su. 15 (*samgavavyāpinī* 6 ghat. to 12). For Yajurvedīs, if Sankramana, Mūdham, heliacal setting of Jupiter or Venus or eclipse concur, then the upākarma is on Bhādrapada pūrnimā; if that also is objectionable, then

the people observe it in Āshāḍha ; but this is not according to the śāstras, which require it in this case to be performed in Śrāvaṇa month.

"Śravaṇa" nakshatra is the date for Ṛigvedīs, whether the tithi be su. 14 or 15 or ba. 1.

For Vājasaneyīs, pūrṇimā must be *madhyāhna vyāpini.*

In Simha month, "Hasta" day is upākarma for Sāmavedīs south of the Narbadha. For those north of the Narbadha, "Hasta" nakshatra in Śrāvaṇa month is the appointed time.

Vatsarārambha—lit: beginning of the year, is the name given to Chaitra su. 1, which marks the commencement of the Hindu lunar year, and which is the su. 1 immediately preceding the Mēsha sankrānti. When there is an *adhika* Chaitra, su. 1 of that month begins the year. Pratipad is *pāraviddha*, i.e., it is kept on the day on which it ends. When pratipad is *kshaya*, it is kept on Amāvāsyā day: when it touches three days, it is kept on the third day.

Yogas—

Budhāshṭamī.—Su. 8 + Wednesday in any month

Ekādaśī Guruvāra vrata.—Ekādaśī + Thursday in any month and either paksha.

Śani trayōdaśi.—Shashthi + trayōdaśī in any month and either paksha.

Krishnāngāraka chaturdaśī vrata.—Krishna paksha 14 + Tuesday in any month (divavyāpini, i.e., must be between sunrise and sunset).

Strīṇām chandradarśanam.—The whole of the night from sunset to sunrise must be pūrṇimā without occurrence of chaturdaśī.

Amāvāsyā Sōmavāra vrata.—Monday + Amāvāsya.	Tithi must be current at sunrise and noon (*divavyāpini*).
Bhānu saptamī.—Sunday + saptami, any month and either paksha.	
Angāraka Chaturthī.—Tuesday + chaturthī.	
Ashṭamī Sōmavāra vrata.—Monday + ashṭamī.	

Mahāpaurnamī vrata.—Moon and Jupiter should join in the nakshatra whence the month takes its name.

Mahāmāgha.—*Saturn* in Mēsha + *moon* in "Māgha" + *Jupiter* in Simha + *sun* in "Śravaṇa" nakshatra.

Mahāvyatīpāta.—*Jupiter* and *Mars* in Simha + *Venus* in Mēsha + su. 12 + "Hasta" nakshatra *in any month.*

Govindadvādaśī.—*Sun* in Kumbha + *Jupiter* in Dhanus + Sukha (i.e., *auspicious*) tithi, vāra, and nakshatra in Phālguna śukla paksha: *otherwise sun* in Kumbha + *Saturn* in Makara + su. 12 + "Pushya" nakshatra.

Kālayōga Tyājya at meeting of Amāvāsyā and pratipad.

Yugādi—

Kritāyugādi—Kārttika su. 9.
Tretāyugādi—Vaiśākha su. 3.
Dvāparayugādi—Māgha Amāvāsyā.
Kaliyugādi—Bhādrapada ba. 13.

Manvādi and Yugādi occurring in *śukla paksha* should be in *pūrvāhṇa*, i.e., beforenoon: if they occur in *krishṇa paksha*, they should be within *aparāhna*, i.e., afternoon.

Yugānta—

Kretāyugānta—Simha	sankrānti.	Same rule as for sankrānti. *q.v.* as regards time of day.
Tretāyugānta—Vriśchika	,,	
Dvāparayugānta—Vrishabha	,,	
Kaliyugānta—Kumbha	,,	

157. *Table of Hindu fasts, feasts and festivals*—

Note—The sign + means 'combined with.' The abbreviation "when +" means "when the tithi in question if combined with." *Asterisks* refer to the alphabetical list prefixed to this table.

Chaitra.

Su. 1. Chāndra Vatsarārambha. Navarātrārāmbha Nimbakusuma pakshana.
,, ,, Vēdavyāsa Tīrtham (Mādhvas).

SU. 3. Āndōlana-tritīyā (*paraviddha*). Gaurī-tritīya Matsajayanti (afternoon). Manvādi.

SU. 5. Lakshmī panchamī or Srīpanchamī (*pūrvaviddha*). Kalpādi * (*pūrvāhna*).

SU. 8. Bhavāni-utpatti (*paraviddha*); bathing special when + Wednesday + Nak. "Punarvasū" Aśokāshtami.

SU. 9. Rāma navami or *Śrīrāma jayanti* (*madhyāhna*). Varāha jayanti aparāhna Kavindira tīrtham (Mādhvas).

SU. 10. Dharmarāja daśamī.

SU. 11. Dōlotsava. Kāmadā ekādaśī. See *Ekādaśī*.

SU. 12. Vāmana dvādaśi. Jayā; when + nakshatra "Pushya." See *Dvādaśi*.*

SU. 13. Madana trayōdasi (*pūrvaviddha*) or Ananga pūjana vrata; god of love worshipped. Satyavrata tīrthānām punyadinam (Mādhvas).

SU. 15. Damanakōtsava (*pūrvaviddha*); (special for bathing when + Sunday, Thursday or Saturday. Manvādi * (forenoon). Hanumatjayanti. Vīrarāghava tīrthānām punyadinam (Mādhvas).

BA. 3. Vāgiśa tīrthānām punyadinam (Mādhvas).

BA. 11. Varūthini ekadaśi. Satyavijaya tīrthānam punyadinam (Mādhavas).

BA. 13. Vāruṇī; when + Nak. "Śatabhishaj." Mahāvāruṇī; when + Nak. "Śatabhishaj" + Saturday. Mahāmahāvāruṇī; when + Nak. "Śatabhishaj" + Saturday + Yoga Śubha. Satyapriya tīrthānām punyadinam (Mādhvas).

BA. 15. Kalpādi.*

Vaiśākha.

SU. 3. Akshayatritīyā (*pūrvaviddha*); special when + Wednesday + Nak. "Rohinī." Trētāyugādi. See *Yugādi*.* Parasurāma jayanti.

SU. 4. Vidyādhirāja tīrtham (Mādhvas).

SU. 5. Sankara's birthday.

SU. 6. Rāmachandra tīrtham (Mādhvas).

SU. 7. Gangā saptamī or Gangōtpatti; birth of Gangā; midday.

SU. 11. Paraśurāma ekādaśī. Mōhini Ekādaśi.

SU. 12. Vyatīpāta (when Nak. "Hasta" + *Jupiter* and *Mars* in Simha + *Sun* in Mēsha).

SU. 13. Narasimha jayanti (*pradōsha*).

SU. 14. Narasimha jayanti.

SU. 15. Vaiśākhi pūrnimā. Sampat Gaurī vrata (*paraviddha*). Kūrma jayanti (*pradōsha*). See *Jayanti* * Maha-Vaiśākhi; when purnimā + *sun* in Mēsha + *Jupiter* in Dhanus + *Mars* in Makara + *Saturn* in Tulā + *Nak.* "Viśākhā" + Varīya *yoga* + Sunday.

BA. 3. Kalpādi * (*pūrvāhna*).

BA. 11. Aparā ekādaśi.

Jyeshtha.

SU. 2. Sopapada. Satyasandha tīrtham (Mādhvas).

SU. 3. Rambhā-tritīyā (*pūrvaviddha*); worship of Bhavāni. Buddha jayanti. Kalki jayanti (*pradōsha*).

SU. 6. Aranya Gaurī vratam (*pūraviddha*).

SU. 10. Daśaharā (expiation of ten sins), *or* Gangāvatāra. Jyēshtha Su. 10 + Wednesday (*or* Tuesday) + Nak. "Hasta" + *Yoga* "Vyatīpatā" is called DAŚAHARI.

SU. 11. Nirjalā ekādaśī.

SU. 12. Rāmalakshmana dvādaśi. Kūrma jayanti * (*pradōsha*).

SU. 15. Rishabha pūja Mahājyeshṭhā (*Jupiter* in Aindra, i.e., *Nak.* "Jyeshṭhā" + *moon* in Aindra or Nak. "Jyeshṭhā" + *sun* in Nak. "Rohinī" + Jyeshṭhā pūrnimā. Manvādi * and Vaṭa Pūrnimā or Vaṭa Sāvitri (*pūrvaviddha*).

BA. 2. Satya pūrna tīrtham (Mādhvas).

BA. 3. Raghu varīya tīrtham (Mādhvas).

BA. 8. Trilōchana pūja.

BA. 13. Yoginī ekādaśi.
BA. 14. Satyābhinava tīrtham (Mādhvas).
BA. 15. Vaṭa Sāvitri vratam (*pūrvaviddha*).

Āshādha.

SU. 2. Ratha-yātra dvitīyā *or* Rāmarathōtsava.
SU. 3. Satyādhirāja tīrtham (Mādhvas).
SU. 5. Skanda-panchamī (*pāraviddha*).
SU. 6. Kumāra shashṭhī (*pāraviddha*).
SU. 7. Vivasvat saptamī; (when + Nak. "Pūrva-Phalguṇī").
SU. 10. Lakshmīvratārambha. Śāka vratārambha. Manvādi* (forenoon).
SU. 11. Śayana ekādaśi (not to be observed in adhika month); *or* Vishnuśayana ekādaśi *or* Vishṇuśayanōtsava; (i.e., Vishṇu going to sleep).
SU. 12. Gōpadma vratārambha. Chaturmāsya* vrata commences.
SU. 14. Pavitrārōpanam (*pāraviddha*). See *Upakarma* *
SU. 15. Vyāsapūrnimā (6 to 9 ghāt after sunrise). Hariśāyanam. (*Sāyāhnaryāpini*). Manvādi* Śivaśayanotsava *or* Kokila vrata *or* Vyāsapūja.
BA. 2 Chāturmāsya dvitīya.* Asūnyaśayana vrata; fast broken at moonrise.
BA. 3. Śrīvijaya tīrtham (Mādhvas).
BA. 7. Special, when + Nak. "Revatī" + Tuesday.
BA. 8. Manvādi.*
BA. 11. Kāmadā or Kāmika ekādaśi. v. *Ekādasī.**
BA. 12. Pāpanāśini, when + Nak "Rohiṇī." See *Dvādaśī.**
BA. 15. Satyādīśa tīrtham (Mādhvas).

Śrāvaṇa.

SU. 3. Madhu-Sravā (in Guzerat).
SU. 5. Nāgapanchamī (*pāraviddha*); worship of snakes.
SU. 6. Suryashashṭhī (*pāraviddha*). Hala-shasṭhī.
SU. 7. Satyavara tirthānām punyadinam (Mādhvas).
SU. 10. Dadhivratārambha
SU. 11. Putradā ekādaśī.
SU. 12. Dāmōdara dvādaśī, Vishnoh-pavitrāropanam.
SU. 14. Varalakshmī vrata, on Friday, nearest to purnimā in śuklapaksha.
SU. 15. Hayagrivōtpatti; Upākarma.* Rig-yajuh-Srāvaṇī. Rakshabandhana (tying a string round the arm), or Rakipūrnimā; or Nāralipūrnimā (when coconuts are thrown into the sea).
Hayagriva jayanti; or Hayagrivotpattī.
BA. 2. Aśūnyaśayana vrata. See "Chāturmāsya dvitīyā." * Rāghavendraswāmi puṇyadinam (Mādhvas).
BA. 3. Kajjalī-tritīyā
BA. 4. Bahula chaturthī; when cows are worshipped.
BA. 7. Sītalā saptamī or Sītalā-vrata (*pūrvaviddha*).
BA. 8. Janmāshtamī. Krishnāshtamī or *Krishna-Jayanti.* Special when + Nak. "Rohinī"; less so when joined only to Monday or Wednesday Manvādi.* Vaishṇavas observe this invariably in Simha month.
BA. 11. Ajā ekādaśī.
BA. 12. Jayantī; (when + Nak "Punarvasū"). See Dvādasī.*
BA. 13. Satyadharma tirthānām puṇyadinam (Mādhvas).
BA. 15. Pithori or Kuśotpatinī (end of Śrāvaṇa). Manvādi.*

Bhādrapada.

SU. 1. Maunavratam (*pūrvaviddha*).
SU. 3. Shōdaśomāvratam. Varāha jayanti (see *Jayanti**). Haritālika; worship of Pārvatī. Manvādi.* Śivā (a name for this tithi). Bālarāma jayanti (*madhyāhna*).

SU. 4. *Vināyaka chaturthī* (*madhyāhnavyāpinī*) Spl. when + Sunday or + Tuesday.
SU. 5. Rishipanchami (*aparāhnavyāpinī*).
SU. 6. Champa shashthī (when + Nak. "Viśākhā" + Yoga Vāidhriti + Tuesday). Sūrya shashṭhī (*pāraviddha*) *or* Skanda shashṭhī.
SU. 7. Amuktābharaṇa saptamī (*pūrvaviddha*). Jayasaptamī Aparājitā. Manvādi.*
SU. 8. Durvāshṭamī (*pūrvaviddha*). Jyeshṭhā pūja (when + Nak. "Jyeshṭhā"). Jyeshthā-Gaurī-pūjna-vrata, when + nakshatra "Jyeshthā."
SU. 9. Nandanavamī. Adhukha-navamī.
SU. 10. Kshīravratārambha. Satyāshthakāma tīrthānām puṇyadinam (Mādhvas).
SU. 11. Vishṇu parivartanōtsava *or* Parivarttana ekādaśī. Lakshmīnārāyaṇa Yoga.
SU. 12. Kalki-dvādaśī. Sakrottāpanam. Vāmana-jayanṭi (*madhyāhna*) (see *Jayanti* *). Srāvana-dvādaśī (when + Nak. Śravaṇa, + Wednesday). Vijaya, (when + Nak. "Śravaṇa"). See *Dvādaśī.**
SU. 14. Anantavratam *or* Anantapadmanābha Chaturdaśī (*pūrvaviddha*); must be current for 3 muhūrthas, *i.e.*, 6 ghaṭikas, after sunrise; and for those who perform this *vrata* for the first time, the tithi must be current at noon.
SU. 15. Praushṭhapadī pūrṇimā *or* Śrāddha.
BA. 1. Mahālayapakshārambha. (Mahālaya when + Nak. "Bharaṇī" in *aparāhna*).
BA. 2. Aśūnyaśayana-vrata. "Chāturmāsya dvitīya." *
BA. 3. Brihatyuma vratam (*pūrvaviddha*).
BA. 6. Chandrashasṭhivratam. Kapila shasthī (when + Nak. "Rōhiṇī" + Yōga "Vyatīpāta" + *Sun* in "Hasta" + Tuesday.
BA. 8. Rudrāshṭamī (*pradōshakāla vyāpinī*). Madhyāshṭamī. Mahālakshmī vrata (*pūrvaviddha*). Ashṭaka Śrāddha.
BA. 9. Durgā navamī (in Maharāshtra). Gajagaurī vratam (when + *Sun* entering nakshatra "Hasta").
BA. 10. Hariśankara Yōga (*pūrvaviddha*), when there is a concurrence (1) of ba. 9 and ba. 10. (2) of Nak. "Punarvasū" and Nak. "Pushya," (3) of "Śivayōga" with "Siddhayōga," and (4) of "Garijakaraṇa" with "Vaṇijakaraṇa"; for 8 ghaṭikas by day or night; may be kept in *adhika* months.
BA. 11. Indirā ekādaśī.
BA. 12. Yatimahālaya (*aparāhna vyāpinī*). Jayā (see Dvādaśī *).
BA. 13. Gajachchāyā (when + *Sun* in "Hasta" + Nak. "Maghā"). Kaliyugādi. See *Yugādi.** Maghā trayōdaśī (Nak. "Maghā").
BA. 14. Vishaśastrahatānām Mahālaya.
BA. 15. Sarvapitri *or* *Mahālaya Amāvāsyā*. Special, when *sun* and *moon* are both in Nak. "Hasta." Mādhava tīrthānām puṇyadinam (Mādhvas).

Āśvina.

SU. 1. Chaṇḍīpūjārambha or commencement of *Navarātri* (*pāraviddha*). Stanavriddhi Gaurī vratam.
SU. 5. Upāngalalita Gaurī vratam: esp. in Mahārashtra (*pūrvaviddha*). Sarasvatīpūjārambha ("Mūla" Nak.). Lalitā panchamī.
SU. 7. About this tithi, when it concurs with Nak. "Mūla," Sarasvatī is worshipped. Satyaprayana tīrthānām puṇyadinam (Mādhvas).
SU. 8. Mahāshṭamī (Spl. when + Tuesday). Satyaparākrama tirthānām puṇyadinam (Mādhvas).
SU. 9. Mahānavamī (*pūrvaviddha*) or Durgā-navami Manvādi.* Āyuda pūja.
SU. 10. Vijayadaśami *or* *Daśara* (*pūrvaviddha*); (Spl. when + Nak. "Śravaṇa"). Rājnyā paṭṭābhishekha (*pāraviddha*).
Sarasvatīpūja (ends in "Śravaṇa" Nak.) Dvidaḷa vratārambha: Buddha-Jayanti. (See *Jayanti.**) Sopapada

Su. 11. Pāśānkuśa ekādaśī.
Su. 12. Padmanābha dvādaśī, Godvādaśi (*pradōsha vyāpinī*). Vijayā (when + Nak. "Śravana"). See *Dvādaśī.* *
Su. 15. Dhanaphalavratārambha, when + Sunday. Kaumudyutsava (*pūrvaviddha*). Kojāgari pūrṇimā or Kojāgari vrata ; worship of Lakshmī and Indra. Games of chance. Navānna pūrṇimā (when new grain is cooked).
Ba. 2. Aśunyaśayana-vrata. See "Chāturmāsya dvitīya." *
Ba. 3. Chandrōdaya Māsa vratam (*pūraviddha*).
Ba. 11. Ramā ekādaśī.
Ba. 12. Gōvatsa dvādaśī.
Ba. 13. Dhanatrayodaśī ; when money lenders worship money.
Ba. 14. Narakachaturdaśī (*pūrvaviddha*) or Dīpāvalipanam, Dīpadānam. Svātyabhyanga (at moonrise).
N B.—Dīpāvali is special on this tithi if joined to Nak "Svāti"
Ba. 15. Kedāra vratam (*pūraviddha*).

Kārttika.

Su. 1. Balipratipad *or* Balipūja.
Su. 2. Yamadvitīyā (*aparāhna vyāpinī*) *or* Bhrātridvitīyā.
Su. 3. Ālochana Gaurī vratam (*pūraviddha*).
Su. 4. Nāga chaturthī (*pūraviddha ; madhyāhna vyāpinī*).
Su. 6. Mahāshasṭhi ; special for feeding of Brahmans when it falls on Tuesday.
Su. 7. Kalpādi * (*pūrvahna*).
Su. 8 Gō-ashṭāmi (*pūraviddha*).
Su. 9. Kretāyugādi See *Yugādi.* *
Su. 10. Satyavara tīrthānām punyadinam (Mādhvas).
Su. 11. Bōdhana ekādaśī *or* Prabodhini ekādaśī Bhīshmapanchaka vrata. Vedanidhi tīrthānām punyadinam. (Mādhvas.)
Su. 12. Yōgeśvaradvādaśī. Kshirābdhi mahōtsava. Chāturmāsya vrata * (begins). Prabōdhotsava *or* Utthāna dvādaśī (preparation for waking Vishnu). Tulasi vivāha. Manvādi.*
Su. 14. Vaikuntha chaturdaśī—midnight (*rātrivyāpini*). Tulasī vratodhyāpanam.
Su. 15. Special (when + Nak. "Krittikā"). Jvālatoranam (*pradōsha vyāpinī*). Dhatri yōga (when + Nak. "Krittikā"). Manvādi * Chāturmāsya vrata (ends). Tripuri pūrṇimā *or* tripurōtsava. Mahākārttikī (when + Nak. "Rohinī"), or when *moon* and *Jupiter* are both in Nak. "Krittikā" on Kārttika su. 15. Pādmakayoga (when + *Sun* in Nak. "Viśākha" + *Moon* in Nak. "Krittikā"). *Krittīka* Festival.
Ba. 2. Kārttika "Chāturmāsya dvitīyā."*
Ba. 3. Vidyānidhi tīrthānām punyadinam (Mādhvas).
Ba. 8. Krishnāshṭamī v. *Ashtamī.** Kāla-Bhairāvāshṭamī *or* Kāla-Bhairava jayanti. Manvādi.*
Ba. 11. Utpatti ekādaśī.
Ba. 13 Yamadīpa (*pradōsha vyāpinī*).
Ba. 14. Padmanābha tīrthānām punyadinam (Mādhvas .

Mārgaśīrsha.

Su. 5. Nāgapūjā or Nagapanchamī.
Su. 6. Skanda shashṭhī (*pūrvaviddha*), *or* Mahā shashṭhī. Champa shashṭhī ; Siva worshipped as Khandoba. Spl. when + Sunday or Tuesday + Nak. "Śatabhishaj" *or* + Yoga "Vaidhriti."
Su. 7. Mitra saptamī (*pūrvaviddha*). Sūryavrata.
Su. 9. Kalpādi (*pūrvāhna*).
Su. 10. Satyanidhi tīrthānām punyadinam (Mādhvas).
Su. 11. Mōkshadā ekādasī. Sātyanātha tīrthānām punyadinam (Mādhvas).
Su. 12. Matsya-dvādaśī. Akanda dvādaśī vratam.

SU. 13. Hanumad vratam (*Abhijitvyāpinī*).
SU. 14. Pāshāṇapakshana (*pradōshavyāpinī*), *or* Pāshāṇa chaturdaśī. Dattātreya jayanti (in some places; elsewhere it is su. 15).
SU. 15. Spl. for donations of salt, when + Nak. "Mrigaśīrsha." Chandra Pūjā (*pradōsha*). *Śiva Pūjā* ("Ārdrā" Nak.). Dattātreya *or* Dattajayanti. Ārdrā festival.*
BA. 1. Raghunātha tīrthānām puṇyadinam (Mādhvas).
BA. 5. Akshobhya tirthānām puṇyadinam (Mādhvas).
BA. 7. Tisroshṭaka * (*aparāhṇa*).
BA. 8. Kālabhairava Ashṭamī (*rātrivyāpinī*). Ashṭaka-Srāddha. Tisroshṭaka* (*aparāhṇa*).
BA. 9. Tisroshṭaka (*aparāhṇa*).
BA. 11. Saphala ekādaśī.

Pausha.

SU. 8. Spl. when + Wednesday + Nak. "Bharaṇī"; † "Rohiṇī" *or* "Ārdrā," according to some.
SU. 11. Putradā ekādaśī *or Mukkoṭi Ekādaśī or Vaikuṇṭha Ekādaśī.* Manvādi.* Raghūttama tīrthānām puṇyadinam (Mādhvas).
SU. 12. Kūrma dvādaśī.
BA. 6. Satyakāma tīrthānām puṇyadinam (Mādhvas).
BA. 7. Tisroshṭaka * (*aparāhṇa*). Naraharitīrthānām puṇyadinam (Mādhvas).
BA. 8. Tisroshṭaka * (*aparāhṇa*). Ashṭaka Śrāddha.
BA. 9. Tisroshṭaka * (*aparāhṇa*).
BA. 11. Shaṭtilā ekādaśī.
BA. 14. Vidyādīśa tīrtham.
BA. 15. Ardhodaya; when + Sunday + Nak. "Śravana" + yoga "Vyatīpāta." The tithi is called *Mahōdaya*, when any one of the above special features is wanting and the others are present. Purandharadāsa tīrtham (Mādhvas).

Māgha.

SU. 4. Tila chaturthī *or* Kunda chaturthī (*pūrvaviddha*) Sopapada.
SU. 5. Madana panchamī (*pūrvaviddha*). Vasanta panchamī; worship of Ratī and Kāma in forenoon; *or* Śripanchamī.
SU. 7. Rathasaptamī (*pāraviddha*) *or* Mahāsaptamī Chandrāvarkavratam. Manvādi.*
SU. 8. Bhīshmadarpaṇam (*pūrvaviddha*). Bhīshmāshṭamī.
SU. 9. Madhva navamī *or* Ananta tīrthānām puṇyadinam (Mādhvas).
SU. 11. Bhīshmapanchakam. Jayā Ekādaśī.
SU. 12. Bhīshmadvādāśī *or* Varāhadvādaśī. Sopapada.*
SU. 13. Kalpādi * (*purvāhna*).
SU. 15. Mahā Māghi; when *moon* and *Jupiter* are both in Nak. "Maghā."
BA. 7. Tisroshṭaka.*
BA. 8. Tisroshṭaka.* Ashṭaka Srāddha.
BA. 9. Rāmadāsa navamī. Tisroshṭaka.*
BA. 11. Vijayā ekādaśī.
BA. 12. Tilā dvādaśī *or* Vijaya when + Nak. "Śravaṇa."
BA. 14. *Mahaśivarātri*—midnight nearest ba. 14, when Nak. "Śravaṇa" is current; spl. when + yoga "Śiva" + Sunday or Tuesday.
If Nak. "Śravaṇa" is current at two successive midnights, the second is *Śivarātri.*
BA. 15. Dvāparayugādi. See *Yugādi.**

Phālguṇa.

SU. 3. Vadiraja Svāmigaḷ puṇyadinam (Mādhvas).
SU. 4. Śānta chaturthī (*pāraviddha*).

SU. 6. Satyavratatīrthānām puṇyadinam (Mādhvas).
SU. 11. Āmalakī ekādaśī.
SU. 12. Narasimhadvādaśī.
SU. 13. Kāmadahanam (*pūraviddha*) at midnight.
The concurrence of Sunday, Saturday, Tuesday or Friday is an objection to the feast: *chaturdaśī* (su. 14) is then the proper day. If that also is objectionable then this festival is celebrated at that midnight at which Nak. "Pūrva Phālguni" is current.
SU. 15. Helikotsava (*sāyāhana vyāpinī*). Manvādi.*
Holikā or Hutāśani pūrṇimā. In South India, Kāman Paṇḍigai, commemorating the destruction of Cupid or Kāmadēva by Śiva.
BA. 1. Vasantotsava. Satyabodha tīrthānam puṇyadinam (Mādhvas).
BA. 2. Chāturmāsya dvitīyā.*
BA. 3. Kalpādi * (*purvāhna*).
BA. 4. Vyāsarāyaswāmigal puṇyadinam (Mādhvas).
BA. 5. Rangapanchamī; when colours are thrown about.
BA. 7. Tisroshṭaka.*
BA. 8. Tisroshṭaka.* Ashṭakaśrāddha.
BA. 9. Tisroshṭaka.*
BA. 11. Pāpamōchini ekādaśī.
BA. 13. Vāruṇī, when + Nak. "Śatabhishaj."
Mahā-Vāruṇī, when + Nak. "Śatabhishaj" Saturday.
Mahā-Mahā-Vāruṇī, when + Nak. "Śatabhishaj" + "*Yoga* Śubha."
BA. 15. Manvādi.*

158. In the following list the feasts, fasts and festivals are arranged in order of tithis:—

Pratipad (*Tithi I*).

The Chaitra śukla *pratipad*, i.e., that which precedes the Mēsha Sankrānti, is the beginning of the Hindu lunar year, New Year's Day (Lunar) being that on which the pratipad is current at sunrise. (When there is an *Adhika Chaitra*, that begins the year.) The tithi is therefore called *Vatsarārambha* (commencement of the year). It is also *Navarātrarāmbha*, there being another *Navarātrarārambhā* on *Āsvina śukla pratipad*.
Kārttika śukla 1 is *Balipratipad* or *Bali pūjā* and it is pūrvaviddha as to time.
Bhadrapada bahula 1 is *Mahālayārambha*.
Phālguna bahula 1 is *Vasantotsava*.

Dvitīyā (*Tithi II*).

Āshāḍa śukla 2 is *Ratha-yātra dvitīya* or *Rāma-rathotsava*.

Kārttika śukla 2 is *Yama dvitīyā* or *Bhrātṛi-dvitīyā* (because sisters make presents to brothers), and the time is afternoon.
The bahula dvitīyā in Āshāḍha, rāvaṇa, Bhādrapada and Āśvina is called *Aśūnyaśayana-vrata* and the fast is broken at moonrise.

Tritīyā (*Tithi III*).

Chaitra śukla 3 is *Gaurī-tritīyā*; also *Matsa-jayantī* (afternoon); also *Manvādi* (forenoon).
Vaiśākha śukla 3 is *Kalpādi* (forenoon); *Tretāyugādi* (forenoon); *Akshaya-tritīyā* special, when combined with Wednesday and Nak. Rōhiṇi; time (forenoon); also *Paraśu-rāma jayantī*.
Jyēshtha śukla 3 is *Rambhā-tritīyā*, when Bhavāni is worshipped at *pūrvaviddha*.
Śrāvaṇa śukla 3 is *Madhu-sravā* in Guzerat.
Śrāvaṇa bahula 3 is *Kajjalī-tritīyā*.
Bhādrapada śukla 3 is *Varāhā-jayantī* (afternoon); *Haritālikā*, when Parvati is worshipped; *Manvādi* (forenoon). The tithi is by some called *Śivā*.
Phālguna bahula 3 is *Kalpādi* (afternoon).

Chaturthī (*Tithi IV*).

The śukla Chaturthī in every month is called *Gaṇeśa Chaturthī* or *Vināyaka Chaturthī*, the chief being *Māgha Chaturthī* (*Gaṇeśa jayantī*). It is celebrated at midday. *Tila*

Chaturthī is another name for Māgha śukla *chaturthī*. It is performed in the evening and is *pūrvaviddha*. *Kuṇḍa Chaturthī* is another name for the same festival.

Bhādrapada śukla chaturthī is special when it falls on Sunday or Tuesday.

Similarly, the bahula chaturthī in every month is *Sankashṭachaturthī* and is a fast day for people in difficulties: the fast is broken at moonrise which is the time. This chaturthī is called *Angāraka Chaturthī* if it falls on Tuesday and continues till moonrise.

Śrāvaṇa bahula chaturthī is called, par excellence, *Bahula Chaturthī* and cows are then worshipped.

Panchamī (Tithi V).

Chaitra śukla 5 is *Sri panchamī* according to some: it is also *Kalpādi* (forenoon).

Śravaṇa śukla 5 is *Nāga panchamī* and snakes are then worshipped. If tithi begins within 6 ghaṭikas after sunrise of one day and ends within 6 ghaṭikas after sunrise on the next day, the tithi is celebrated on the former day and that is Nāgā panchamī.

Bhādrapada śukla 5 is *Rishi panchamī* (midday).

Āśvina śukla 5 is *Lalitā panchamī* or *Upānga-lalitā-vrata*, when Durgā is worshipped in the afternoon.

Margaśīrsha śukla 5 is *Nāgapūja* or *Nāga panchamī*.

Magha śukla 5 is *Vasanta panchamī*, when Rati and Kāma are worshipped in forenoon. *Śrī panchamī* is another name.

Phālguna bahula 5 is *Ranga panchamī*, when colours are thrown about.

Shashṭī (Tithi VI).

Śravaṇa śukla 6 is *Kalki-Jayantī* (sunset), the last avatāra of Vishnu.

Śrāvaṇa bahula 6 is *Hala Shashṭhī*.

Bhādrapada śukla 6 is *Sūrya-Shashṭhī* or *Skanda-Shashṭhī*.

Bhādrapada bahula 6 is *Chandra Shashṭhī*. It is called *Kapila-Shashṭhi* when it combines on Tuesday with Nak. Rohini and Yoga Vyatīpāta and the sun is in Hasta.

Kārttika śukla 6 is special for feeding of Brahmans when it falls on Tuesday.

Margaśīrsha śukla 6 is *Skanda-Shashṭhī* or *Mahā-Shashṭhī*; *Champā-Shashṭhī*, when Śiva is worshipped as Khandoba. This tithi is special when it falls on Sunday or Tuesday and combines with Nakshatra Satabhishaj and Yoga Vaidhṛiti, or either of the two.

N.B.—Eye-table **S** shows that Nak. Satabhishaj (No. 24) may concur with the tithi in a year in which some month before Mārgaśīrsha is 'adhika', but Yoga Vaidhṛiti (No. 27) can never concur with this tithi Eye-table v.

Saptamī (Tithi VII).

A *saptamī* on Tuesday, combined with Nak. Revatī (that is, by Eye-table, section **S** bahula 7 in Āshāḍha or Śukla 7 in Pausha or Māgha) is very auspicious. A *śukla saptamī*, falling on Sunday, is called *Vijaya*, and is special for donations. A *śukla saptamī*, joined with the first quarter of Nak. Hasta, is called *Bhadrā*. A *śukla saptamī*, coinciding with a Sankrānti, is called *Mahajayā*, which, for making donations, is superior even to an eclipse.

Vaiśākha śukla 7 is *Gangā-Saptamī* or *Gangotpatti* (birth of Gangā—midday).

Śrāvaṇa bahula 7 is *Sītalā-Saptamī* or *Sītalā-Vrata*, time *pūrvaviddha*.

Bhadrapada śukla 7 is called by some *Āparājitā*.

Āśvina śukla 7: about this tithi *Sarasvatī* is worshipped under Nakshatra Mūla.

Kārttika śukla 7 is *Kalpādi* (forenoon).

Mārgaśīrsha śukla 7 is *Sūryavrata*.

Māgha śukla 7 is *Ratha-Saptamī* or *Mahā-Saptamī* (time, *aruṇodhaya*); *Manvādi* (forenoon.)

Ashṭamī (Tithi VIII).

An *Ashṭamī*, falling on Wednesday, is special and receives the name of *Budhāshṭamī*. The *Śukla Ashṭamī* in every month is sacred to Durgā or Annapūranā; while the *Bahula Ashṭamī* in every month, called *Kālāshṭamī*, celebrated at pūrvaviddha, is sacred to Krishṇa.

Chaitra śukla 8 is *Bhavānī-utpatti*: when joined with Wednesday and Nak. Punarvasū; bathing on this tithi is special.

Śrāvaṇa bahula 8: *Janmāshṭamī*, *Krishṇāshṭamī* or *Krishṇa Jayanti* (midnight); special when combined with Nak. Rohinī; less so, when joined only to *Monday* or *Wednesday*; *Manvādi* (afternoon).

Bhādrapada śukla 8: *JyeshthāGāuri-pūjana-vrata*, when moon is in Nak. Jyesthā.

Bhādrapada bahula 8: *Mahalakshmī vrata* (pūrvaviddhā); *Ashṭaka-śrāddha.*

Āśvina śukla 8 is *Mahāshṭamī* and is special when joined to Tuesday.

Kārttika śukla 8 is *Gopāshṭamī,* when cows are worshipped.

Kārttika bahula 8 is *Krishnāshṭamī, Kāla-Bhairavāshṭamī,* or *Kāla-Bhairavajayantī.*

Mārgaśīrsha bahula 8 is *Ashṭaka-śrāddha* in the afternoon. The same is the case with bahula 8 in Pausha, Māgha and Phālguna.

Pausha śukla 8 is special when joined to Wednesday and Nak. Bharaṇi (Rōhiṇī or Ārdra, according to some).

Māgha śukla 8 is *Bhīshmāshṭamī* and is celebrated at midday.
Māgha bahula 8 is Birth of Sītā.

Navami (*Tithi IX*).

Chaitra śukla 9 is *Rāma-navamī* or *Rāma-jayantī,* at midday.

Bhādrapada śukla 9 is *Adukkha-navamī.*

Āśvina śukla 9 is *Mahā-navamī* or *Durgā-navamī*: *Manvādi* (forenoon).

Kārttika śukla 9 is *Kritāyugādi* (forenoon).

Mārgaśīrsha śukla 9 is *Kalpādi* (forenoon).

Māgha bahula 9 is *Rāmadāśa navamī.*

Daśami (*Tithi X*).

Jyēshtha śukla 10 is *Daśa-harā* (expiating ten sins) or *Gaṅgāvatāra.*

Ashāḍa śukla 10 is *Manvādi* (forenoon).

Āśvina śukla 10 is *Vijayadaśamī* or *Daśara* (afternoon), special with Nak. Śrāvaṇa; *Buddha-jayantī.*

Dvādaśī (*Tithi XII*).

The *Dvādaśī* is called *Mahā-dvādaśī* in the following circumstances:—

11th Tithi current at sunrise on two successive days: the next Dvādaśī is called Unmīlanī.

12th Do. do. : the Dvādaśī is called Vanjulī.

12th Tithi, to be followed by a full moon or a new moon tithi, current at two sunrises—Pakshavardhinī.

12th Tithi, joined with Nakshatra *Pushya,* is Jaya [*i.e.*, by Eye-table s, Bahula 12 in Bhād., or śukla 12 in Phālg. or Chait.]

Do. *Śrāvaṇa* is Vijaya [*i.e.*, by Eye-Table s, śukla 12 in Bhād., Asv.,; Bahula 12 in Phālg.].

Do. *Punarvasū* is Jayanti [*i.e.*, by Eye-table s, śukla 12 in Phālg.; Bahula 12 in Srāvaṇa].

Do. *Rohiṇī* is Papanasinī [*i.e.*, by Eye-table s, śukla 12 in Pausha, Māgha, Bahula 12 in Āshāḍha].

Vaiśākha śukla 12, joined with Nak. *Hastā,* and Jupiter and Mars in *Siṁha,* sun in *Mesha,* is *Vyatīpata.*

Āshāḍa sukla 12 is the commencement of *Chāturmāsya vrata.*

Śrāvaṇa śukla 12 is *Vishnoh-pavitrā-ropaṇam.*

Bhādrapada śukla 12 is *Vāmana jayantī* (midday); called Śrāvaṇa Dvadaśi, when joined with Nak. *Śrāvaṇa,* and specially, when further joined with *Wednesday.*

Āśvina bahula 12 is *Govatsa Dvādaśī* (evening).

Kārttika śukla 12: (1) end of *Chāturmāsya vrata,* which began on same tithi in Āshāḍha.
(2) *Prabodhotsava* or *Utthāna dvādaśī* (preparation for waking Vishnu).
(3) *Tulasī vivāha* (marriage of Vishnu with the Tulasi plant).
(4) *Manvādi* (forenoon).

Māgha śukla 12: *Bhīshma dvādaśī.*

Māgha bahula 12: Tila dvādaśī or Vijaya, when combined with Nak. *Śrāvaṇa.*

[*N.B.*—This can only happen when a month previous to *Māgha* is Adhika—See Eye-table s]

Trayōdaśī (*Tithi XIII*).

Chaitra śukla 13: *Madana trayodaśī* or *Ananga Pūjana vrata* (pūrvaviddha): God of Love worshipped.

Bhādrapada bahula 13: (1) *Kaliyugādi* (afternoon).
(2) Māgha trayodasi, when combined with Nak. *Maghā*.
(3) *Gajachaya*, when joined to Nak. *Maghā* and sun in *Hasta*.

Āśvina bahula 13: *Dhana trayōdaśī*, when money-lenders worship money.
Māgha śukla 13: *Kalpādi* (forenoon).

Phālguna bahula 13: (1) Vāruni, when joined with Nak. *Satabhishaj*.
(2) Mahāvāruni, when joined with Nak. *Satabhishaj* + *Saturday*.
(3) *Mahā-Mahā-Vāruni* when joined with Nak. *Satabhishaj* + *Saturday* + Yoga *Subha*.

[*N.B.*—Combinations (1) to (3) can happen only when Phalguni or some previous month is Adhika—See Eye-table 8.]

Chaturdaśī (Tithi XIV).

Bahula Chaturdaśi in every month is *Sivarātri*.
Vaiśākha śukla 14: *Narasimha jayantī* (sunset). special when joined to Nak. Svāti + *Saturday*
Śrāvana śukla 14: *Varalakshmī vrata*.
Bhādrapada śukla 14: *Ananta chaturdaśī*.
Āśvina bahula 14: *Naraka chaturdaśī* (moonrise), fasting to avoid *naraka* or hell. Dīpavali (see *Āsvina amāvāsyā* below), may fall on this tithi if joined to Nak. Svāti.
Kārttika śukla 14: *Vaikuntha chaturdaśī* (midnight).
Mārgaśīrsha śukla 14: *Pāshāna chaturdaśī*
Māgha bahula 14: *Mahā Śivarātri* (midnight, when Nak. Śravana is current).
Special, when combined with *Sunday* or *Tuesday* and Yoga *Śiva*.

[*N.B.*— Yoga *Śiva* can combine with Śivarātri only when some month previous to Magha is *Adhika*. See Eye-table 8.]

Sukla Panchadaśī (Tithi XV): śukla 15 or Pūrnimā, full moon.

A śukla 15 or Pūrnimā is called *Somavatī* when it falls on Monday and is special for donations.
It is called Chūdamani when it is *further* joined with a lunar eclipse.
Most pūrnimās receive special names, which are given below :—

Chaitra pūrnimā:—(1) *Manvādi* (forenoon).
(2) *Hanumat-jayantī*.
(3) Special for bathing, when combined with Sunday, Thursday or Saturday.

Vaiśākha pūrnimā:—*Kūrma jayantī* (late afternoon)

Jyēshtha pūrnimā:—(1) *Manvādi* (forenoon).
(2) *Vata pūrnimā* or *Vata Sāvitrī* (pūrvaviddha).
(3) *Maha-jyaishthī*, when moon and Jupiter are in Nak. *Jyēshthā* and sun in Rohini.

Āshāda pūrnimā:—(1) *Manvādi* (forenoon).
(2) *Śivaśayanotsava*, or *Kokilā-vrata* or *Vyāsapūjā*.

Śrāvana pūrnimā:—(1) *Rig-yajur-Śrāvana* (*i.e.*, Śrāvana for followers of Rig and Yajur Vedas).
(2) *Rakshābandhana* (tying a string round the arm) or *Rakhi-pūrnimā* or *Nāralī pūrnimā* (throwing coconuts into the sea)
(3) *Hayagrīva Jayanti*.

Bhādrapada pūrnimā:—*Praushthapādī pūrnimā* or *śrāddha*.

Āśvina pūrnimā:—(1) *Kojāgari pūrnimā* or *Kojāgara vrata* (midnight). Lakshmi and Indra worshipped; games of chance.
(2) *Navānna pūrnimā*, when new grain is cooked.

Kārttika pūrnimā:—(1) *Manvādi* (forenoon).
(2) *Chāturmāsya vrata* ends.
(3) *Tripurī pūrnimā* or *tripurotsava*.
(4) Special when joined to Nak. Krittikā.
(5) *Mahā kārttika*, when joined to Nak. *Rōhinī*; or when moon and Jupiter are both in Nak. *Krittikā*.

(6) *Padmakayoga*, when moon is in Nak. *Kṛittikā* and sun in Nak. *Viśākha*.
(7) Kṛittikā festival in Southern India.

Margaśirsha Pūrnimā:—(1) *Dattā treya* or *Datta-jayantī* (evening).
(2) Special for donations of salt, when joined to Nak Mrigaśirā.
(3) Ārdrā festival in honour of Śiva at Chidambaram and else where Śiva, in his incarnation of Nateśa, is said to have been born on Mārgaśirsha Pūrnimā under the Nakshatra *Ārdrā* · the combination could take place only when some month previous to Mārgaśirsha was *adhika*. (See Eye-table s.)

Māgha Pūrnimā Maha-Maghi, when Moon and Jupiter are both in Nak. Maghā

Phālguna pūrṇimā: (1) *Manvādi* (forenoon).
(2) *Holikā* or *Hutāsani pūrnima* (evening).
(3) *Kāman Paṇḍigai* (in South India destruction of the Indian Cupid by Śiva)

Bahula Panchadaśī (*Tithi XV*): *Amāvāsyā—New Moon.*

A solar eclipse on Sunday is Chudamani, and is special for donations.

Amāvāsyā at the end of Śrāvana and beginning of Bhadrapada: *Pithori* or *Kusotpātini*.

Amāvasyā at the end of Bhādrapada and beginning of Aśvina. *Sarvapitri* or *Mahālaya Amāvāsyā*: special when sun and moon are both in Nak. *Hasta*.

Amāvasyā at the end of Aśvina and beginning of Karttika is *Dipāvali*, with previous and following tithis: that on which Nak. is *Svāti* being the special day

Amāvāsyā at the end of Pausha and beginning of Magha (1) Ardhodaya, when joined with *Sunday* in day time + Nak. *Śrāvaṇa* + Yoga Vyatipāta

[*N.B*—This can only happen when some month previous to Māgha is Adhika]

Amāvāsyā at the end of Pausha and beginning of Magha (2) Mahodaya when any one of these special features is wanting.

Amāvāsyā at the end of Magha and beginning of Phālguṇa: (1) Dvāparayugadi (afternoon).
(2) Special for Srāddhas, when joined with Nak. *Satabhishaj* or Nak. *Dhanishṭha*.

Amāvāsyā at the end of Phālguna and beginning of Chaitra: *Manvādi* (afternoon).

N.B—Miss Underhill's *Hindu Religious Year* (1921—*Religious Life of India Series*) contains a full popular account of Hindu religious fasts, feasts and festivals

SECTION XX.—*The Muhammadan year.*

159. The Muhammadan era, commonly called *Hejra* or *Hijra*, is dated from Friday, 16 July, A.D. 622, the day of the flight of the Prophet.

The Muhammadan calendar is not luni-solar like the Indian calendar, but strictly lunar. The length of the synodical month according to the Muhammadan calendar is 29 days 12 hours 44 minutes. The three seconds reckoned in addition in the Hindu calendar are neglected in the Muhammadan. The months are alternately 29 and 30 days long, which, again, if carried out uniformly, would result in an error of 44 minutes per month, which, in 360 months, or 30 lunar years, would amount to $\frac{360 \times 44}{60 \times 24} = 11$ days. These 11 days are accordingly added to the last month of the calendar in 11 out of every 30 years, and the year containing an extra day is, from analogy, sometimes called a leap year.

160. Every 30 years form a cycle in the Muhammadan calendar. The years which have 355 days, instead of 354, are in some countries the 2nd, 5th, 7th, 10th, 13th, 15th, 18th, 21st, 24th, 26th and 29th. Elsewhere, the 2nd, 5th, 8th, 10th, 13th, 15th, 19th, 21st, 24th, 27th and 29th are kept as leap years.

It will be noticed that the difference of usage is as regards the 8th, 19th and 27th years in each cycle. The generality of authorities (including the Encyclopædia Britannica) have adopted the 7th, 18th and 28th years of each cycle as leap years and the Ephemeris follows this usage.

161. All the books that deal with the Muhammadan calendar mention the above difference of usage, but they do not give the reason of it. The reason is, however, not far to seek.

If we write down the accumulated error which remains at the end of each year by reason of the neglect to take account of 44 minutes and which was adverted to in the first section of this chapter, we obtain the following result under the system of reckoning the 8th, 19th and 27th as leap years:—

Year. Error.	How error is corrected by leap year.	Year. Error	How error is corrected by leap year.
1st year, 8 hrs. 48′		16th year, 20 hrs. 48′	6th day added by leap year.
2nd year, 17 hrs. 36′	1st day added by leap year.	17th year, 5 hrs. 36′	
3rd year, 2 hrs. 24′		18th year, 14 hrs. 24′	
4th year, 11 hrs. 12′		19th year, 23 hrs. 12′	7th day added by leap year.
5th year, 20 hrs. 0′	2nd day added by leap year.	20th year, 8 hrs. 0′	
6th year, 4 hrs 48′		21st year, 16 hrs. 48′	8th day added by leap year.
7th year, 13 hrs 36′		22nd year, 1 hr. 36′	
8th year, 22 hrs. 24′	3rd day added by leap year.	23rd year, 10 hrs. 24′	•
9th year, 7 hrs 12′		24th year, 19 hrs. 12′	9th day added by leap year.
10th year, 16 hrs 0′	4th day added by leap year	25th year, 4 hrs 0′	
11th year, 0 hrs. 48′		26th year, 12 hrs. 48′	
12th year, 9 hrs. 36′		27th year, 21 hrs. 36′	10th day added by leap year.
13th year, 18 hrs. 24′	5th day added by leap year.	28th year, 6 hrs. 24′	
14th year, 3 hrs. 12′		29th year, 15 hrs. 12′	11th day added by leap year.
15th year, 12 hrs. 0′		30th year, *Nil*.	

Those who observe the 8th, 19th and 27th years as leap years add a day by means of a leap year in order to avoid the error accumulating to more than 1 *day* at the end of the following year; while those that observe the 7th, 18th and 26th as leap years add a day by means of a leap year in order to avoid the error accumulating to more than *half a day* at the end of the following year.

162. The months and the number of days in each are as follows:—

Month	Number of days.	Day of commencement reckoning from beginning of year.	Month.	Number of days	Day of commencement reckoning from beginning of year
1. Muḥarram ..	30	.	7. Rajab	30	177
2. Ṣafar ...	29	30	8. Sha'bān ...	29	207
3. Rabī-ul-awwal ...	30	59	9. Ramazān	30	236
4. Rabī-ul-ākhir or Rabī-us-sani ..	29	89	10. Shawwāl ...	29	266
5. Jamāda'l-awwal	30	118	11. Zī-l-ka'da	30	295
6. Jamāda'l akhir or Jumad-us-sani .	29	148	12. Zī-l-hijja .	29	325
			Do (when intercalary) ...	30	

All readers are familiar with the names of two of the Muhammadan months, *Muḥarram* and *Ramazān*, and all are equally familiar with the fact (due to the strictly lunar character of the year) that Muḥarram is liable to occur at any part of the solar year.

163. The Muhammadan day, like the Jewish, is reckoned from sunset to sunset, and the first day of Muḥarram is that on which the moon is for the first time visible at sunset after new moon. This is called the heliacal rising of the moon. Our readers are familiar with the Muhammadan usage of observing the heliacal rising of the moon from eminences of any sort, and passing word as soon as she is seen, so as to give notice that Muḥarram has commenced.

To the reader who is by this time quite at home among tithis and their ending moments, we would quote the following rule from Messrs. SEWELL & DIKSHIT'S *Indian Calendar*:—

"It is well to note that where the first tithi of a month ends not less than 5 ghaṭikas before sunset, the heliacal rising of the moon will probably take place on the same evening; but where the first tithi ends 5 ghaṭikas or more after sunset, the heliacal rising will probably not take place till the following evening. When the first tithi ends within these two periods between 5 ghaṭikas before and 5 ghaṭikas after sunset, the day of the heliacal rising can only be ascertained by elaborate calculations."

Where so much depends upon sunset and moonrise, it is obvious that places with different longitudes and latitudes will often not agree in regard to the exact date of commencement of the Muhammadan year.

CHAPTER IV.—CONSTRUCTION OF TABLES.

SECTION i.—*Theory of anomalies and equations of the centre.*

164. The uses of the Eye-table, sections **e** to **i**, will be sufficiently obvious from examples already worked out. We may therefore give in this place in popular language a theory of anomalies and their equations.

165. From the fact that the orbit of the moon as well as that of the earth is elliptical, not circular, it follows that the motions of these bodies cannot be uniform from day to day or from hour to hour. This irregularity is called the *eccentricity* of the orbit and the correction to be applied on this account is called the equation of the centre.

166. The following extract from Professor Jacobi's Table in Vol. I of *Epigraphia Indica* will serve to introduce the reader to the general theory of solar and lunar anomalies, and it will also show how the material furnished by the siddhântas has been worked into sections **e** to **i** of the Eye-table in the present work. Professor Jacobi's tables are reproduced more fully at pages 79 to 81 below. See explanation prefixed to these tables on pages 75 to 77 below.

Sûrya siddhânta—

☾'s eqn. + ; ☉'s eqn. −				☾'s eqn − ; ☉'s eqn. +				Moon's equation of the centre.			Sun's eqn of the centre.		
Deg.	Min	Deg.	Min	Deg.	Min.	Deg	Min.	Deg.	Min	Sec.	Deg.	Min.	Sec.
0	0	180	0	180	0	360	0	0	0	0	0	0	0
30	0	150	0	210	0	330	0	2	32	0	1	6	3
60	0	120	0	240	0	300	0	1	22	30	1	53	26
90	0	90	0	270	0	270	0	5	2	46	2	10	31

167. Let us try to interpret in detail the meaning of this table. We are supposed to measure the moon's rate of progress, beginning from perigee, the point when she is nearest the earth, and at every step we must distinguish the moon's mean position, i.e., the position which she would have attained at a uniform rate of motion equal to the mean, and the actual position which she attains on account of the eccentricity of her orbit.

168. The mean and actual positions are the same at 0° or 360°, i.e., at perigee and at 180°, i.e., at apogee.

When the moon's mean position is 30° from perigee, her actual position has advanced by 2 degrees 32 minutes.

When her mean position ought to be 60°, we find her actually at 64° 22′ 30″ from perigee.

When her mean position ought to be 90°, that is half way between perigee and apogee, she is actually 95° 2′ 46″ from perigee.

From this point she begins to move more slowly, though her actual position is still in advance of the mean.

At 120° from perigee, she is 4° 22′ in advance of the mean position, that is, exactly as she was at mean 60°.

At 150° from perigee she is only 2° 32′ in advance of the mean position.

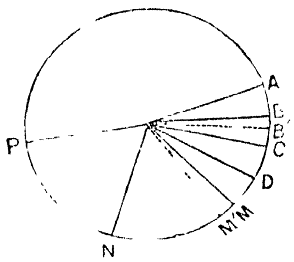
From 180° onwards she begins to slow down, and when she ought to be 210° from perigee, or 30° from apogee, we find she has reached only 210° *minus* 2° 32′ or 207° 28′. When she ought to be 270° from perigee, she is only 270° *minus* 5° 2′ 46″ or 264° 57′ 14″.

From 270° onwards she begins to move quicker, though she is still behind her mean position. At 300° she is behind by 4° 22′ 30″ and at 330° she is behind her mean position by only 2° 32′ and at 360° or at perigee she is even with her mean position.

169. In like manner we might trace the sun's mean and actual positions from perigee through apogee back to perigee, using the figures in the last column of the above table, from which we see that the maximum equation of the centre for the sun is 2° 10′ 31″.

170. In our tables (except under Planetary Table IV) we do not refer to the sun's or moon's position by degrees, but by days, which is more readily intelligible and handier for purposes of calculation. Our Eye-table, sections **e** to **i**, is simply the result of a careful expansion of the tables at pages 79 to 81 below from which the above figures have been extracted.

171. It is now necessary to explain how the *anomaly* and equation in degrees are converted into days and fractions of a day. Let us suppose the sun and the moon to move in the same plane and in circular orbits, describing equal spaces in equal times. Let AB, BC, CD be the mean spaces described by the sun in three successive tithis, and let AM, MN, NP be the corresponding mean spaces described by the moon in the same tithis. If there were no irregularity or eccentricity in the sun's and moon's motions, the first tithi would be the time taken by the moon to gain 12°, that is, the arc BM over the sun; similarly the second and third tithis would be the periods in which the moon gains (MN *minus* BC) and (NP *minus* CD) over the sun. But owing to the eccentricity of their orbits we will suppose the sun to be at B′ (actual position) when he ought to be at B (mean position) and the moon to be at M′ (actual position) when she ought to be at M (mean position). Then in the period of a mean tithi (·9843 day) the moon gains over the sun the arc B′M′ but our tithi is the period during which the moon actually gains over the sun 12°, i.e., we must cut off from B′M′ an arc equal to BM and determine the time during which that length is gained by the moon. Our problem would be solved if we knew the time during which B′M′ *minus* BM was gained by the moon.



172. Now B′M′ *minus* BM = MM′ *minus* BB′. The time during which MM′ — BB′ is gained, is evidently the time during which MM′ is gained *minus* the time during which BB′ is gained. The times during which MM′ and BB′ are respectively gained are obtained by turning MM′ and BB′ into days at the rate of 29·53058 days to 360°. For nakshatra and yoga equations other scales, viz., 27·32166 days and 25·4202 days respectively to 360° were used for converting degrees into days. For the moon's anomaly, the scale 360° = 27·5546 days was used.

173. As the equation for the sun as well as the equation for the moon is sometimes positive and sometimes negative, and for *tithis* we have to take the *difference* between the two equations, some confusion would result from our having to change signs so often. Therefore the sun's equations are tabulated, as in the extract given above, with the signs *reversed*. That is why the sun's eccentricity, starting from perigee, is shown in the table extracted above as negative whereas it is really positive.

174. The reader will also observe that the moon's equation in the above table is, as it should be, positive between perigee and apogee, whereas in Eye-table **e** to **g** it is negative for the same period. The reason is that when the moon does in a given time *more* than the mean space, this is equivalent to a given space being done in *less* than mean time. This is why in the Eye-table, which derives equations of time from equations of space, the signs of space-equations are reversed. In the case of the sun's equations, a double reversion of signs takes place, first a reversion in order to make the operation of combining the sun's and moon's equations always an addition, and secondly a reversion in order to derive equations of time from equations of space. As a final result, the sun's equation of time is shown in Eye-table **h** as positive after perigee and negative after apogee. A third reversion takes place in calculating sunrise, where we have to derive equations of space from equations of time.

175. In calculating tithis, all we have to do, is to sum up the equations of the sun and the moon according to the Eye-table whether they are positive or negative. Before taking the moon's equation, however, we in practice add to or deduct from the moon's anomaly the sun's equation and we determine the equations for the net moon's anomaly. The reason is that when the effect of the sun's anomaly is to diminish or increase the mean time that would be necessary for a tithi, it is necessary to take the moon's anomalies for the altered mean time.

176. Conversely, in calculating *yogas*, where we have to take the sum of the proper anomalistic equations of the sun and the moon, our yoga equations in the Eye-table have had to be suitably altered as to their signs.

177. For *nakshatras*, we have to convert the moon's eccentricity, in other words her equation of the centre, into days at the rate of the moon's sidereal motion, i.e., 360° for 27·32166 days.

178. The sun's anomaly in the Eye-tables (sections **h** and **i**) is expressed, not in days of the *anomalistic* year, but as days of the *solar* year, and this is done for convenience of use. The length of the modern anomalistic year is 365·2596 days while that of the Hindu sidereal year is 365·2587 days. There is no practical error in adopting, as the Indian siddhāntīs have done, an identical period for the anomalistic and solar sidereal years. The modern anomalistic lunar month is, like the Hindu anomalistic month, 27·5546 days. In converting degrees of anomaly into days we, therefore, put—

Sun's anomaly : 360° = 365·258756481 days.
Moon's anomaly : 360° = 27·45 159999 days.

179. The above theory of anomalies and equations is subject to an important variation in practice. Supposing a mean tithi is accomplished at A days of the solar year, when the moon's anomaly is B days, then, if the ☉'s equation for A days is—a, this means that the tithi would be accomplished (supposing for the moment that the ☾'s anomaly had no influence) in $A-a$ days of the solar year, at a moment when the moon's anomaly would be $B-a$. Now we proceed to determine the influence of this moon's anomaly $B-a$ and find the moon's equation to be, let us suppose, $-b$. We then put down, as the actual ending moment of the tithi, $A-a-b$ days of the solar year.

180. Strictly speaking, we ought to take (1) the sun's equation for $A+b+a$ days of the solar year, where b is the equation (positive or negative) of the moon for anomaly B, and a is the ☉'s equation, positive or negative, for A days of the solar year, (2) the moon's equation for anomaly of $B+a$ days, and then add the equation so found. But in practice this refinement is not necessary for the sun's equation, since the maximum value of $b+a$ is (·1138 + ·1784 =) ·5922 day, and the maximum variation of the sun's equation for this period is about ·0018 day or 6 palas only. We may note, however, that in the test example, worked by Prof. Jacobi for Āshādha śukla 12, K.Y. 3585, a difference of 4 palas does occur between his method and Mr. Dikshit's, and the learned Professor rightly surmises in a footnote (*Ep. Ind.*, Vol. I, p. 430) that the difference must be due to an abridgment in the Hindu method. We now see what the abridgment consists in.

SECTION ii.—*Tables for converting space into time.*

181. In the body of the present work as well as in the connected tables measures of time alone are used, and measures of space (i.e., *degrees* of celestial longitude, *degrees* of mean anomaly of the sun and moon, etc.), have been generally excluded. This is the principle known as Largeteau's method, which was first applied to Indian astronomical computation by Professor Jacobi in 1888. Messrs. Sewell and Dikshit have applied the same principle in their "*Indian Calendar*" (1896). The present method is founded on Largeteau's principle, but differs materially from it as well as all previous applications of it in one important respect. Instead of using Largeteau's method to discover how much *space* has been accomplished at a particular moment of time, the present writer has used an adaptation of the method to discover the *moment of time* at which a particular extent of space has been accomplished. Thus, instead of determining the expired portion of a tithi, corresponding to a given moment of time (i e., generally to mean sunrise on a particular day), as is done by Messrs. Jacobi and Sewell, and then calculating the unexpired portion of the tithi by means of successive approximations, the present writer investigates, directly and once for all, the *ending moment of a tithi*, the very thing required by Indian usage. Not only does this procedure abridge the labour of ascertaining ending moments of tithis, nakshatras and yogas, but it furnishes a very ready criterion for testing whether a month is *adhika* or *kshaya*, whether two tithis ended on the same day, etc.

182. The principles upon which space was converted into time for the purposes of the present work are set forth in the following paragraphs.

183. The principal measure of space, the distance of the moon from the sun, was converted into days in the ratio of 29·530587946 days to 360° in the case of the Sūrya siddhānta, 29·5305925 days to 360° in the case of the Ārya siddhānta, and 29·530582052 days in the case of the Brahma siddhānta and Siddhānta Śiromani.

184. The increase of the moon's age, according to the *Sūrya siddhānta*, for each solar year is according to the above rate of conversion, 10·891701184 days.

Instead of reckoning the increase of the moon's age, however, the present method reckons directly the *retardation in the date of appearance of the first new moon* in each solar year, for which purpose it is, of course, necessary to deduct 10·8917011 34 days from 29·530587946 days: result, 18·638886812 days. This, then, is the number of days by which the appearance of the first new moon is retarded each year, and the first thing to do every year is to calculate the interval of retardation for that year. The interval (if we take the retardation for one year) will, *ipso facto*, be the date of appearance of the first or Vaisākha new moon in solar year 1 of Kaliyuga (expired). From this date all other mean new moons for that or any subsequent solar year may be found by the successive addition of multiples of 29·53059 days; and the mean ending moment of every tithi is given by the addition of the tithi equivalent in days (according to the Eye-table section **d**) to the date of mean new moon. Precisely the same method was followed for the Ārya siddhānta, Lalla's corrections being introduced at the appropriate date, and for the Brahma siddhānta and Siddhānta Śiromaṇi.

185. The mean anomaly, in the case of the moon as well as that of the sun, was reckoned from perigee, as in Professor Jacobi's article in the *Indian Antiquary* (1888), and not from apogee, as in his articles in Volumes I and II of *Epigraphia Indica*. For the purpose of the Eye-table, the moon's mean anomaly was converted into days in the ratio of 27·554599899 days to 360° in the case of the Sūrya siddhānta, and of 27·554566936 days to 360° in the case of the Ārya siddhānta. The increase of the moon's mean anomaly for a single solar year is thus:—

Sūrya siddhānta, 7·048957797 days.
Ārya siddhānta, 7·049310381 days.

The anomaly of the moon at the first moment of Kaliyuga was taken as 90° from perigee, that being the figure according to all the authorities. From the year A.D. 1600, the corrected period of the anomalistic month (27·55459797 days) has been adopted for Sūrya siddhānta calculations.

186. The moon's mean anomaly, as entered in the Eye-table, corresponds to the *tithi* or *space* accomplished, while the equation is the addition to or deduction from the tithi, to be made in order to arrive at the *time* or *ending moment* of the tithi. Consequently, the equation in time was in every case added to or deducted from the mean anomaly, after the conversion of the anomaly in degrees into anomaly in days. The same procedure was adopted in regard to the sun's equation. This procedure is explained more fully in the next section.

SECTION iii.—*Construction of sun's and moon's anomaly tables, i.e., of Eye-table, sections* **e** *to* **i**.

187. The accompanying three tables show, in detail, the different processes employed in the computation of the sun's and moon's anomaly and equation tables in Eye-table, sections **e** to **i**.

188. Table I shows (1) how the 0 day of the sidereal-anomalistic year was arrived at for the Eye-table, sections **h** and **i**; (2) corrections to be applied at different epochs when using Eye-tables, sections **h** and **i**; (3) Śōdhya in degrees and in days at different epochs under Brahma siddhānta, Siddhānta Śiromaṇi and Sūrya siddhānta.

189. SPECIAL TABLE I.—The sun's anomaly at the moment of commencement of the mean solar year (columns 2, 8 and 14) was taken from Professor Jacobi's tables in *Ep. Ind.*, Vol. I, and the śōdhya in degrees entered in the columns next to the above were obtained by conversion from Dr. Schram's figures quoted in Mr. Sewell's *Indian Chronography*. By subtracting the śōdhya from the anomaly at 0 day, mean solar year, we obtain the sun's anomaly at the commencement of the true solar year, namely, at *Mēsha sankrānti*, which is entered in columns 4, 10 and 16 of Special Table I. The anomaly in degrees being converted into solar days at the rate of 1·0146 days for each degree (this ratio is the same for all siddhāntas), and the result being subtracted from the total number of days in the year, 365·26 days (for all siddhāntas), we have the 0 day of the sidereal-anomalistic year for the purpose of the Eye-table, sections **h** and **i**. In the Ārya siddhānta alone the sidereal year is absolutely identical with the anomalistic year and the 0 day is 81·29 days of the solar year always. In the other siddhāntas, the anomalistic year is slightly different from the sidereal year and this is shown by the variation

of the śōdhya from century to century. Nevertheless for the construction of anomaly tables the 0 day of a particular epoch has to be selected. It will be seen from Table I, columns 7, 13 and 19, that the 0 day shown in the Eye-table pertaining to the several siddhāntas is correct for the following respective epochs:—

Brahma siddhānta, K.Y. 3900 to 4000.
Siddhānta Śiromaṇi, *Circa* K.Y. 550.
Súrya siddhānta, K.Y. 3600 to 3800.

190. The Brahma siddhānta could not have been brought into use much before the eighth century A.D., and the 0 day of the Eye-tables, sections **h** and **i** is correct for that century. The corrections to be applied for subsequent centuries, up to a maximum of—·04, may be neglected, since the sun's anomalistic equation undergoes hardly any change in the first three decimal places for ·04 of a day. Similar observations apply to the Sūrya siddhānta anomaly tables which may be used for any epoch in the epigraphical period without correction.

191. It is hardly worth while to construct separate anomaly tables for the Siddhānta Śiromani which was intended by its author Bhāskarāchārya merely as a recension of the earlier Brahma siddhānta; but it will be seen from column 9 of Table I that the śōdhya changes rapidly from century to century, and the period for which the Brahma siddhānta Eye-tables, sections **h** and **i** would be quite correct for the Siddhānta Śiromani, is somewhere between K.Y. 500 and K.Y. 1000, i.e., *Circa* 2600 B.C. During the epigraphical period in particular, and remembering that the Siddhānta Śiromani could not have been in use earlier than the twelfth century A.D., when it was composed, a correction from 1 to 1·25 days has to be applied when using the Brahma siddhānta, Eye-table **h** and **i**, for the Siddhānta Śiromani. Thus in calculating a tithi or a yoga by the Siddhānta Śiromani in, say, the fourteenth century A.D. each of the sun's anomalies in days, entered in the Eye-table **h** and **i** should be read as if it was 1·18 days less. In other words, supposing the equation by the Siddhānta Śiromani for a sun's anomaly of 90 days was required, we should take from the Brahma siddhānta Eye-table **h** or **i** as the case may be, the equation corresponding to a sun's anomaly of 90 minus 1·18 days, or 88·82 days. For practical purposes it is enough if one day is deducted from all the sun's anomalies in Brahma siddhānta, Eye-table **h** and **i** when applying the Siddhānta Śiromani. It will be seen that in working the illustrative problem appended to the Brahma siddhānta Eye-table, we deduct ·90 of a day from the sun's anomaly for a date in A.D. 484; the case is purely supposititious, however, since the Siddhānta Śiromani did not come into use till some eight centuries later.

192. We may now consider *Special Table II* which shows the process of converting the sun's anomalies and equations in degrees into anomalies and equations in days of the solar year and fractions of a day. The entries in columns 1 to 4, 9, 19 and 34 are taken from Professor Jacobi's table in Vol. I of *Ep. Indica*, showing the sun's anomaly and equation in 24 stages by the different siddhāntas. In the transformation of those figures into Eye-table, sections **h** and **i**, the following stages may be noted:—

(1) Before the stages of the anomaly could be converted into days of the solar year, the first step, namely the determination of 0 day of the sidereal-anomalistic year, 80·23 days for Brahma siddhānta and Siddhānta Śiromani, 80·55 days for the Sūrya siddhānta and 81·29 days for the first Ārya siddhānta (columns 5, 15 and 30 of Table II) was effected in the manner already explained under Special Table I. The subsequent stages of anomalies entered in columns 5 to 8, 15 to 18, and 30 to 33 were arrived at by adding successively the day equivalent of 3·75 degrees, the unit stage in Professor Jacobi's tables.

(2) The conversion of the equations in columns 9, 19 and 34 of Special Table II, which are in degrees, into days was effected at the rate of 29·53059 days for 360 degrees for tithi equations and 25·4202 days for 360 degrees for yoga equations.

(3) The sun's anomaly in days, already determined, was corrected by including or excluding the corresponding equations, as each case might require; this process requires some explanation and somewhat careful reflection on the part of the reader who makes acquaintance with it for the first time. Some of the observations below can be more easily understood with reference to the moon than

193. To construct an Indian Calendar of tithis and nakshatras, we have to pass at every step from *the mean phase of a moment* to the *moment of the actual phase*, and *from the anomaly at the mean ending moment of a tithi, or yoga, to the actual ending moment of the tithi or yoga*, and we have to accomplish this passage, in other words, to bridge the interval, by means of an equation. The "phase of a moment," say, the phase accomplished by the moon at sunrise on a particular day, can be calculated, as is done by Professor Jacobi, by ascertaining, first the mean phase accomplished at that moment, and then the fraction of the phase resulting from the addition of the acceleration in degrees (let us call it A) or retardation in degrees (which we might call R), corresponding to the mean anomaly of that moment. For most purposes this is enough, because it will enable us to determine approximately the time in which the remainder of the phase will be accomplished, and all we want generally is to find out on what day between sunrise and sunrise a particular tithi or phase actually ended.

194. But we may also want to know when the tithi actually ended, which knowledge is necessary (1) when a tithi is likely to have ended about the moment of sunrise, and we want to know definitely whether it preceded or followed sunrise, for in either case the day of the tithi would have a different vara or week day, (2) when we want to know the limits of an adhika month or of a kshaya month. Every Indian panchānga, therefore, always gives the ending moment of a tithi in ghaṭikas and palas; i.e., in 4 decimal places of a day, and our aim is to devise a method which will give us this result.

195. We know the moment of every mean phase just as we know the mean phase of every moment; we know also for any moment, which we may call **n** the mean phase or the mean event of some other kind which must belong to it and also the acceleration in time (— **a**) or retardation in time (+ **r**), belonging to the mean anomaly of that moment. For instance, we know that at a moment **n** the moon attains a mean elongation of 96°, in other words that **n** is the mean ending moment of the 8th tithi: we also know what the mean anomaly, which we may call M, of that moment is; lastly we know that the acceleration belonging to that moment is + A in degrees or that the retardation belonging to that moment is — R in degrees, so that the actual place of the moon at that moment **n** is, 96° + A, or 96° — R. But what we wish to know further for the purposes of Indian astronomy is the moment, let us call it **x**, when the moon's mean elongation plus the acceleration or retardation belonging to that moment will together exactly equal 96°.

196. The contents of the first ten columns of Special Tables II and III (pages 79, 81 below) which are all the material we have in Prof. Jacobi's and other existing tables will not enable us to solve this problem, and we shall have to attack it in a somewhat indirect manner, as shown in the remaining columns of Special Tables II and III. In doing so, we lay down, as our fundamental proposition, *that the mean anomaly in days of the moment of an actual phase* (which anomaly we may denote by **m**) + the *acceleration in fraction of a day, appropriate to that phase* (which we may call **a**) = *mean anomaly in days of the moment of the mean phase*. A little reflection will convince the reader that the same equation serves as a bridge (1) between the mean ending moment and the actual ending moment of a tithi and (2) between the mean anomaly at the mean ending moment and the mean anomaly at the actual ending moment of a tithi. We shall also use this identity. We proceed to arrange according to the above proposition and the above identity the mean anomalies noted in columns 5 to 8 of Special Table III and the accelerations noted in column 10 of the same table. The formula for retardations is exactly similar, namely, *the mean anomaly of the moment of an actual phase minus the retardation appropriate to that phase*, or **m** — **r** = *mean anomaly of the moment of the mean phase (in days)*.

When the mean anomaly of the moon at the moment of an actual phase or tithi is ·287 day (column 5), this quantity *plus* the acceleration due to that anomaly, ·0271 day (column 10), or ·3141 day, is the mean anomaly at the moment of the corresponding mean phase or tithi This means that when the mean anomaly at the mean ending moment of a tithi is ·3141 day, the equation, i.e., the time difference between the ending moments of the mean and the actual tithi, is ·0271 day. We proceed to tabulate other results in the same way with pairs of figures of which one is taken from column 10 and the other from columns 5 to 8.

(1)	For a mean anomaly, at mean tithi end, of	·287 day	+ ·0271 day or	·314 day, the equation is	– ·0271 day.
(2)	" "	3·444 days	+ ·2932 "	3·787 days "	– ·2932 "
(3)	" "	6·889 "	+ ·4139 "	7·303 " "	– ·4139 "
(4)	" "	10·633 "	+ ·2932 "	10·925 " "	– ·2932 "
(5)	" "	13·490 "	+ ·0271 "	13·517 " "	– ·0271 "
(6)	" "	14·064 "	– ·0271 "	14·037 " "	+ ·0271 "
(7)	" "	17·222 "	– ·2982 "	16·929 " "	+ ·2982 "
(8)	" "	24·110 "	– ·2932 "	23·817 " "	+ ·2932 "

Cases (1) to (4) illustrate acceleration (**a**), while cases (5) to (8) illustrate retardation (**r**).

These results are made use of in columns 11 to 14 of Special Table III.

197. In the same manner columns 5 to 8 of Special Sun-Table II, page 79 below, for Brahma siddhānta and Siddhānta Śiromani, are corrected in columns 11 to 14 for tithi equations; columns 15 to 18 (Sūrya siddhānta) headed **m** are corrected in columns 22 to 25 for tithi equations, and become **m + a, m — r** and are corrected again in columns 26 to 29 for yoga equations and then become **m — r, m + a**; and lastly columns 30 to 33 (first Ārya siddhānta), headed **m** are corrected in columns 36 to 39 for tithi equation and become **m + a, m — r.** That is, the equations in column 10 are added to the uncorrected anomalies in columns 5 and 6 in order to form the corrected anomalies in columns 11 and 12; and the same equations in column 10 are subtracted from the uncorrected anomalies in columns 7 and 8 in order to form the corrected anomalies in columns 13 and 14 for tithi equations. Exactly the same processes of addition and subtraction account for the transformation of columns 15 to 18 into columns 22 to 25 (Sūrya siddhānta) and that of columns 30 to 33 into columns 36 to 39 (First Ārya siddhānta). The case for addition becomes one for subtraction, and *vice versa*, in the case of yogas; as an example of this is shown the transformation of the uncorrected anomalies in columns 15 to 18 into corrected anomalies for yoga equations by the sūrya siddhānta in columns 30 to 33.

The symbols M, **m**, A, **a**, R, **r**, in the senses above explained, are retained in the headings of Special Tables II and III on pages 79 to 81 below, in order that the reader may be enabled to follow easily the different steps of the process. It will be seen that the equations in degrees in column 9 of both tables and in other similar columns are called " A or R " and the equations, as decimals of a day, are called " — **a** or + **r**," because (1) the same quantities, when positive, are called A and **r** respectively, and when negative, they are called R and **a** respectively, that is, an acceleration in space is a decrease of time: while a retardation in space means an increase of time in *passing from the mean to the actual ending moment of a tithi or phase*: and (2) the combination **m + a** means that when an anomaly in days is **m + a**, the corresponding equation is **— a**; similarly, when the anomaly in days **m — r**, the corresponding equation is **+ r.**

From the 24 stages entering into various columns in Special Tables II and III and called " anomalies corrected for equations," are obtained; by interpolation, the different stages required for Eye-tables, sections **e** to **i**, pages 171 to 194 below. For example, in column 11 of Special Table II (page 79), the equation corresponding to a sun's anomaly of 123·20 days is —·1177 days and the equation corresponding to a sun's anomaly of 127·02 days is —·1262 day. From these anomalies and equations we derive by proportional parts,

☉'s anomaly		Equation
123·35 day	—	·118 day (1).
126·94 day	—	·126 day (2).

Between (1) and (2) we proceed to interpolate, again by proportional parts, the anomalies corresponding to the following equations: — ·119 — ·120 — ·121 — ·122 — ·123 — ·124, and — ·125 as in Brahma siddhānta, Eye-table **h** for tithis, page 193 infra; the same device is used in regard to moon's anomalies and equations—Special Table III, page 81 and Eye-table **e** to **g**, pages 171 to 192 below

198. The anomalies and equations of the moon for nakshatras, Eye-table, section **f**, are not shown in Special Table III, because they are dealt with in exactly the same manner, only with a different scale of conversion, as stated elsewhere, paragraph 46, page 14. Equations according to the second Ārya siddhānta are also shown in Special Table III in order to bring out the fact that they differ from equations according to the first Ārya siddhānta only in the fourth decimal place, and that, therefore, separate anomaly and equation tables for the second Ārya siddhānta are not necessary.

I.—Table showing (1) *how the* **0** *day of the* ***sidereal-anomalistic*** *year indicated in* ***heavy type in*** *columns* 6, 12, 18, ***was arrived*** *at for Eye-table, sections* **h** *and* **i**;
(2) *corrections to be* ***applied*** *at different epochs* ***when*** *using Eye-tables* **h** *and* **i**;
(3) *Sodhya in degrees at* ***different*** *epochs under* ***Brahma*** *siddhānta, Siddhānta Sirōmaṇi and Sūrya siddhānta.*

Year Kali-yuga.	BRAHMA SIDDHĀNTA. Sun's anomaly at moment of commencement of *mean* solar year.	Śodhya in degrees.	Sun's anomaly at commencement of true solar year.		Day of Indian solar year corresponding to 0 day of anomalistic year	Correction to be applied when using the Eye-table, sections **h** and **i**	SIDDHĀNTA ŚIRŌMAṆI. Sun's anomaly at moment of commencement of *mean* solar year.	Śodhya in degrees.	Sun's anomaly at commencement of true solar year		Day of Indian solar year corresponding to 0 day of anomalistic year.	Correction to be applied when using the Eye-table, sections **h** and **i**.	SŪRYA SIDDHĀNTA. Sun's anomaly at moment of commencement of *mean* solar year.	Śodhya in degrees.	Sun's anomaly at commencement of true solar year.		Day of Indian solar year corresponding to 0 day of anomalistic year	Correction to be applied when using the Eye-table, sections **h** and **i**
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	DEGREES.	DEGREES.	DEGREES.	DAYS.	DAYS	DAY.	DEGREES	DEGREES	DEGREES.	DAYS.	DAYS.	DAY.	DEGREES	DEGREES.	DEGREES.	DAYS.	DAYS.	DAY.
0	282·2400	2·14069	280·09031	284·1888	81·07	+·16	282·2400	2·14069	280·0993	284·1888	81·07	+·16	282·8704	−2·1377	280·7327	284·8364	80·43	+·10
500							282·0959	2·14082	279·9542	284·0448	**81·22**	+·01	282·8542	−2·1378	280·7164	284·8149	80·45	+·10
1000	282·2000	2·14095	280·0591	284·1450	81·11	+·12	281·9500	2·1425	279·8075	283·8927	81·36	−·13	282·8381	−2·1379	280·7002	284·7984	80·46	+·09
2000	282·1600	2·14120	280·0188	284·1071	81·14	+·09	281·6600	2·1443	279·5157	283·5967	81·66	−·43	282·8058	−2·1381	280·6677	284·7654	80·50	+·05
3000	282·1200	2·14145	279·9786	284·0663	81·19	+·05	281·3700	2·1462	279·2238	283·3000	81·96	−·73	282·7734	−2·1383	280·6351	284·7324	80·53	+·02
3100	282·1160	2·14148	279·9745	284·0621	81·19	+·04	281·3410	2·1463	279·1947	283·2704	81·99	−·76	282·7702	−2·1383	280·6319	284·7291	80·53	+·02
3200	282·1120	2·14150	279·9705	284·0581	81·19	+·04	281·3120	2·1465	279·1655	283·2408	82·02	−·79	282·7670	−2·1383	280·6287	284·7259	80·53	+·02
3300	282·1080	2·14152	279·9665	284·0540	81·20	+·03	281·2830	2·1467	279·1363	283·2102	82·05	−·82	282·7637	−2·1383	280·6254	284·7225	80·54	+·01
3400	282·1040	2·14155	279·9625	284·0500	81·21	+·02	281·2540	2·1469	279·1071	283·1806	82·08	−·85	282·7605	−2·1383	280·6222	284·7193	80·54	+·01
3500	282·1000	2·14157	279·9584	284·0458	81·21	+·02	281·2250	2·1471	279·0779	283·1510	82·11	−·88	282·7573	−2·1384	280·6189	284·7159	80·54	+·01
3600	282·0960	2·14160	279·9544	284·0417	81·22	+·01	281·1960	2·1472	279·0488	283·1214	82·14	−·91	282·7540	−2·1384	280·6156	284·7126	**80·55**	+·00
3700	282·0920	2·14162	279·9504	284·0377	81·22	+·01	281·1670	2·1474	279·0196	283·0918	82·17	−·94	282·7408	−2·1384	280·6124	284·7092	80·55	+·00
3800	282·0880	2·14165	279·9464	284·0336	81·22	+·01	281·1380	2·1476	278·9904	283·0612	82·20	−·97	282·7476	−2·1384	280·6092	284·7060	80·55	+·00
3900	282·0840	2·14167	279·9423	284·0295	**81·23**	+·00	281·1090	2·1478	278·9612	283·0316	82·23	−1·00	282·7443	−2·1384	280·6059	284·7037	80·56	−·01
4000	282·0800	2·14170	279·9383	284·0254	81·23	+·00	281·0800	2·1480	278·9320	283·0020	82·26	−1·03	282·7411	−2·1385	280·6026	284·7303	80·56	−·01
4100	282·0760	2·14172	279·9343	284·0213	81·24	−·01	281·0510	2·1482	278·9028	282·9724	82·29	−1·06	282·7379	−2·1385	280·5994	284·6971	80·56	−·01
4200	282·0720	2·14175	279·9303	284·0173	81·24	−·01	281·0220	2·1483	278·8737	282·9452	82·32	−1·09	282·7346	−2·1385	280·5961	284·6937	80·57	−·02
4300	282·0680	2·14177	279·9262	284·0132	81·24	−·01	280·9934	2·1485	278·8445	282·9156	82·35	−1·12	282·7314	−2·1385	280·5929	284·6905	80·57	−·02
4400	282·0640	2·14180	279·9222	284·0092	81·25	−·02	280·9640	2·1487	278·8153	282·8860	82·38	−1·15	282·7282	−2·1385	280·5897	284·6872	80·57	−·02
4500	282·0600	2·14182	279·9182	284·0051	81·25	−·02	280·9350	2·1489	278·7861	282·8564	82·41	−1·18	282·7249	−2·1386	280·5863	284·6858	80·58	−·03
4600	282·0560	2·14185	279·9142	284·0010	81·25	−·02	280·9060	2·1491	278·7569	282·8262	82·44	−1·21	282·7217	−2·1386	280·5831	284·6805	80·58	−·03
4700	282·0520	2·14187	279·9101	283·9969	81·26	−·03	280·8770	2·1492	278·7277	282·7966	82·47	−1·24	282·7185	−2·1386	280·5799	284·6773	80·58	−·03
4800	282·0480	2·14190	279·9061	283·9928	81·26	−·03	280·8480	2·1494	278·6986	282·7670	82·50	−1·27	282·7152	−2·1386	280·5766	284·6739	80·59	−·04
4900	282·0440	2·14193	279·9021	283·9888	81·27	−·04	280·8190	2·1496	278·6694	282·7374	82·53	−1·30	282·7119	−2·1386	280·5733	284·6706	80·59	−·04
5000	282·0400	2·14195	279·8981	283·9847	81·27	−·04	280·7900	2·1498	278·6402	282·7078	82·56	−1·33	282·7086	−2·1387	280·5699	284·6671	80·59	−·04

II.—Sun-table, showing process of converting anomalies and equations in degrees into anomalies and equations in days of the solar year for the purposes of the Eye-table, sections **h** *and* **i**. *For explanation of the symbols* **m**, M, **a**, A, **r**, R, *see paragraphs* 193, 196 *of the Text.*

Stages of the sun's anomaly in degrees according of Prof. Jacobi, *Ep Ind.*, Vol. I.				Brahma siddhānta and Siddhānta Śiromani. Sun's anomaly in days of the solar year uncorrected for equation (Brahma siddhānta and Siddhānta Śiromani)				Sun's equation in degrees.	Equation in decimals of a day.	Sun's anomaly in days of the solar year (Brahma siddhānta and Siddhānta Śiromani), corrected for tithi equation.				Sūrya siddhānta. Sun's anomaly in days of the solar year, uncorrected for equation				Sun's equation in degrees
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
M	M	M	M	**m**	**m**	**m**	**m**	+ A or − R	− **a** or + **r**	**m** + **a**	**m** + **a**	**m** − **r**	**m** − **r**	**m**	**m**	**m**	**m**	+ A or − R
Eqn. +	Eqn. +	Eqn. −	Eqn. −	Eqn −	Eqn. −	Eqn +	Eqn. −			Eqn. −	Eqn −	Eqn. +	Eqn +	Eqn. −	Eqn. −	Eqn. +	Eqn +	
DEGREES.	DEGREES.	DEGREES	DEGREES.	DAYS.	DAYS	DAYS	DAYS.	DEGREES.	DAY	DAYS	DAYS	DAYS	DAYS	DAYS.	DAYS	DAYS	DAYS	DEGREES
·00	180 00	180 00	360 00	81 23	263 86	263 86	81 23	0000	0000	81 23	263 86	263 86	81 23	80·55	263 18	263 18	80·55	0000
3 75	176 25	183 75	356 25	85 03	260 06	267·66	77 43	1422	0117	85 04	260·07	267 65	77·42	84 34	259 37	266 98	76 74	1455
7 50	172·50	187 50	352·50	88 84	256 25	271 47	73·62	2842	0233	88 86	256 27	271 45	73 60	88 16	255 57	270 79	72 94	·2900
11·25	168 75	191·25	348·75	92·64	252 45	275 27	69 82	4244	0348	92 67	252 48	275 24	69 79	91 96	251 76	274 59	69 13	·4327
15 00	165 00	195·00	345 00	96·45	248 64	279 08	66 01	5630	·0462	96 50	248 69	279 03	65 96	95 77	247 96	278 40	65·33	·5733
18 75	161·25	198 75	341 25	100 25	244 84	282 88	62·21	·6992	·0573	100 31	244 90	282 82	62·15	99 57	244·15	282·20	61·52	·7105
22 50	157 50	202 50	337 50	104 06	241 03	286·69	58·40	8319	0682	104·13	241 10	286 62	58 23	103 38	240 35	286·01	57 72	8444
26 25	153 75	206 25	333 75	107 86	237 23	290·49	54 60	9617	·0789	107·94	237 31	290 41	54 52	107 18	236 54	289 81	53 91	9747
30 00	150 00	210·00	330·00	111 67	233 42	294·30	50 79	1 0875	0892	111·76	233 51	294 21	50·70	110 99	232 74	293 62	50 11	1 1008
33·75	146 25	213 75	326 25	115 47	229 62	298 10	46·99	1 2086	0991	115 57	229·72	298 00	46 89	114 79	228·93	297 42	46 30	1·2216
37·50	142 50	217·50	322 50	119 28	225 81	301 91	43 18	1 3242	1086	119 39	225·92	301 80	43 07	118 60	225·13	301 22	42 50	1 3869
41 25	138 75	221·25	318·75	123·08	222 01	305 71	39 38	1 4344	·1177	123 20	222 13	305·59	39 26	122 40	221 32	305·03	38 69	1·4464
45 00	135 00	225 00	315 00	126 89	218 20	309 52	35 57	1 5380	·1262	127 02	218 33	309 49	35·44	126 21	217 52	308 83	34 89	1 5492
48·75	131·25	228 75	311 25	130 69	214 40	313·32	31 77	1 6358	·1342	130 82	214 53	313 19	31 64	130 01	213 72	312 64	31 08	1 6455
52·50	127 50	232 50	307·50	134 50	210 59	317 13	27·96	1 7261	1416	134 64	210 73	316 99	27·82	133 82	209 91	316 44	27 28	1·7347
56 25	123·75	236 25	303 75	138 30	206 79	320 93	24 16	1 8089	1484	138 45	206 94	320 78	24 01	137·62	206 11	320 25	23 47	1 8164
60 00	120 00	240 00	300 00	142·11	202·98	324 74	20 35	1 8842	1546	142 26	203 13	324 59	20 20	141 43	202 30	324 05	19 67	1 8905
63 75	116 25	243 75	296 25	145 91	199 18	328 54	16 55	1 9514	1601	146 07	199 34	328 38	16 39	145 23	198 50	327 86	15 87	1 9561
67·50	112 50	247·50	292 50	149 72	195 37	332·35	12·74	2 0103	1649	149 88	195 53	332 19	12 58	149 03	194 69	331 66	12 06	2 0188
71·25	108 75	251 25	288 75	153 52	191 57	336 15	8·91	2·0603	·1690	153 69	191·74	335 98	8 77	152 84	190 89	335 47	8 26	2 0627
75 00	105 00	255 00	285 00	157 33	187 76	339 96	5·13	2 1011	1723	157 50	187 93	339 79	4 96	156 64	187 08	339 27	4 45	2 1030
78 75	101 25	258 75	281 25	161 13	183 96	343 76	1·33	2 1386	1750	161 30	184·13	343 59	1·16	160 45	183 28	343 08	0 65	2 1344
82 50	97 50	262 50	277 50	164 94	180 15	347 57	362 78	2 1569	·1769	165 12	180 33	347·39	362 60	164·25	179·47	346 88	362 10	2 1572
86·25	93·75	266 25	273 75	168 74	176·35	351 37	358 98	2 1708	1781	168·92	176 53	351 19	358 80	168 06	175 67	350 68	358 30	2 1708
90·00	90 00	270·00	270 00	172·54	172·54	355 17	355 17	2·1753	·1784	172 72	172 72	354 99	354 99	171 86	171 86	354 49	354 49	2 1753

II.—Sun-table, showing process of converting anomalies and equations in degrees into anomalies and equations in days of the solar year for the purposes of the Eye-table—cont.

SŪRYA SIDDHĀNTA.

Sun's equation converted into decimals of a day. For tithis.	Sun's equation converted into decimals of a day. For yogas.	Sun's anomaly in days of the solar year, corrected for tithi equation.				Sun's anomaly in days of the solar year, corrected for yoga equation.			
20	21	22	23	24	25	26	27	28	29
+r or −a	+r or −a	m + a	m + a	m − r	m − r	m − r	m − r	m + a	m + a
		Eqn.−	Eqn.−	Eqn +	Eqn +	Eqn +	Eqn +	Eqn.−	Eqn.−
DAY.	DAY.	DAYS.	DAYS.	DAYS.	DAYS	DAYS.	DAYS	DAYS.	DAYS.
·0000	0000	80·55	263·18	263·18	80·55	80·55	263·18	263·18	80·55
·0119	·0103	84·36	259·38	266·97	76·73	84·34	259·36	266·99	76·75
·0238	·0205	88·18	255·59	270·77	72·92	88·14	255·55	270·81	72·96
·0355	·0306	92·00	251·80	274·55	69·03	91·93	251·73	274·72	69·16
0470	·0405	95·82	248·01	278·35	65·28	95·73	247·92	278·44	65·37
·0583	·0502	99·63	244·21	282·14	61·46	99·52	244·10	282·25	71·57
·0693	·0596	103·45	240·42	285·94	57·65	103·32	240·29	286·07	57·78
·0799	·0688	107·26	236·62	289·73	53·83	107·11	236·47	289·88	53·98
·0903	·0777	111·08	232·83	293·53	50·02	110·91	232·66	293·70	50·19
·1002	·0863	114·89	229·03	297·32	46·20	114·70	228·84	297·51	46·39
·1097	0944	118·71	225·24	301·11	42·39	118·51	225·04	301·31	42·59
·1186	·1021	122·52	221·44	304·91	38·57	122·30	221·22	305·13	38·79
·1271	·1094	126·34	217·65	308·70	34·76	126·10	217·41	208·94	35·00
·1350	1162	130·14	213·85	312·51	30·95	129·89	213·60	312·76	31·20
·1428	1225	133·96	210·05	316·30	27·14	133·70	209·79	316·56	27·40
·1490	·1283	137·77	206·26	320·10	23·32	137·49	205·98	320·38	23·60
·1551	·1335	141·59	202·46	323·89	19·51	141·30	202·17	324·18	19·80
·1605	·1381	145·39	198·66	327·70	15·71	145·09	198·36	328·00	16·01
·1652	1422	149·20	194·86	331·49	11·89	148·89	194·55	331·80	12·21
·1692	·1457	153·01	191·06	335·30	8·09	152·69	190·74	335·62	8·41
·1725	·1485	156·81	187·25	339·10	4·28	156·49	186·93	339·42	4·60
·1751	·1507	160·63	183·46	342·90	0·47	160·30	183·13	343·23	0·80
·1769	·1523	164·43	179·65	346·70	361·92	164·10	179·32	347·03	362·25
·1781	·1533	168·24	175·85	350·51	358·12	167·91	175·52	350·84	358·45
	·1536	172·04	172·04	354·31	354·31	171·71	171·71	354·64	354·64

FIRST ĀRYA SIDDHĀNTA.

Sun's anomaly in days of the solar year, uncorrected for equation				Sun's equation for tithis. In degrees.	Sun's equation for tithis. In days	Sun's anomaly in days of the solar year, corrected for tithi equations.			
30	31	32	33	34	35	36	37	38	39
m	m	m	m	+A or −R	−a or +r	m + a	m + a	m − r	m − r
Eqn.−	Eqn.−	Eqn.+	Eqn +			Eqn.−	Eqn.−	Eqn.+	Eqn.+
DAYS.	DAYS.	DAYS.	DAYS	DEGREES.	DAY.	DAYS	DAYS.	DAYS	DAYS.
81·29	263·92	263·92	81·29	0000	·0000	81·29	263·92	263·92	81·29
85·09	260·12	267·72	77·49	·1405	·0115	85·10	260·13	267·71	77·48
88·90	256·31	271·53	73·68	·2805	0230	88·92	256·33	271·51	73·66
92·70	252·51	275·33	69·88	·4189	·0344	92·73	252·54	275·30	69·85
96·51	248·70	279·14	66·07	·5561	·0456	96·56	248·75	279·09	66·02
100·31	244·90	282·94	62·27	·6905	·0566	100·37	244·96	282·88	62·21
104·12	241·09	286·75	58·46	·8219	0674	104·19	241·16	286·68	58·39
107·92	237·29	290·55	54·66	·9500	·0779	108·00	237·37	290·47	54·58
111·73	233·18	294·36	50·85	1·0744	0881	111·82	233·57	294·27	50·76
115·53	229·68	298·16	47·05	1·1936	0979	115·63	229·78	298·06	46·95
119·34	225·87	301·97	43·24	1·3080	·1073	119·45	225·98	301·86	43·13
123·14	222·07	305·77	39·44	1·4169	·1162	123·26	222·19	305·65	39·32
126·95	218·26	309·58	35·63	1·5194	1246	127·07	218·38	309·46	35·51
130·75	214·46	313·38	81·83	1·6155	·1325	130·88	214·59	313·25	31·70
134·56	210·65	317·19	28·02	1·7050	·1399	134·70	210·79	317·05	27·88
138·36	206·85	320·99	24·22	1·7869	·1466	138·51	207·00	320·84	24·07
142·17	203·04	324·80	20·41	1·8611	·1527	142·32	203·19	324·65	20·26
145·97	199·24	328·60	16·61	1·9275	1581	146·13	199·40	328·44	16·45
149·78	195·43	332·41	12·80	1·9855	·1629	149·94	195·59	332·25	12·64
153·58	191·63	336·21	9·00	2·0350	·1669	153·75	191·80	336·04	8·83
157·39	187·82	340·02	5·19	2·0755	·1702	157·56	187·99	339·85	5·02
161·19	184·02	343·82	1·39	2·1075	·1729	161·36	184·19	343·65	1·22
165·00	180·21	347·63	362·84	2·1305	·1748	165·17	180·38	347·46	362·67
168·80	176·41	351·43	359·04	2·1444	·1759	168·98	176·59	351·25	358·86
172·60	172·60	355·23	355·23	2·1489	·1763	172·78	172·78	355·05	355·05

III.—Moon-table showing method of converting anomalies and equations in degrees into anomalies and equations in days and fractions of a day for the purposes of the Eye-table, sections **e** *to* **g**. *For explanation of the symbols* **m**, *M*, **a**, *A*, **r**, *R*, *see paragraphs* 193, 196 *of the text.*

Stages of the anomaly in degrees according to Prof Jacobi, *Ep. Ind.*, Vol. I.				Sūrya siddhānta tithis. Moon's anomaly in days uncorrected for equation.				Equation in degrees	Equation as a fraction of a day	Moon's anomaly in days corrected for tithi equation				Sūrya siddhānta yogas. Equations in decimals of a day.	Moon's anomaly in days corrected for yoga equation				Equations according to Brahma siddhānta and Siddhānta Siromani. For Tithis.		Equations according to first Ārya siddhānta. For Tithis.		Equations according to second Ārya siddhānta. For Tithis.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
M	M	M	M	**m**	**m**	**m**	**m**	A or R	**a** or **r**	**m** + **a**	**m** + **a**	**m** − **r**	**m** − **r**	− **a** or + **r**	**m** + **a**	**m** + **a**	**m** − **r**	**m** − **r**	+ A or − R	− **a** or + **r**	+ A or − R	− **a** or + **r**	+ A or − R	− **a** or + **r**
Eqn +	Eqn +	Eqn.−	Eqn.−	Eqn −	Eqn −	Eqn +	Eqn.+			Eqn −	Eqn −	Eqn +	Eqn +		Eqn −	Eqn −	Eqn +	Eqn.+						
Degrees	Degrees	Degrees.	Degrees.	Days	Days.	Days	Days.	Degrees.	Day	Days	Days.	Days	Days.	Day	Days.	Days.	Days	Days.	Degrees	Day	Degrees	Day	Degrees	Day
00	180·00	180 00	360 00	000	13 777	13·777	27·555	·0000	0000	·000	13 777	13·777	27 555	0000	·000	13 778	13 778	27·555	·0000	00000	·0000	00000	0000	·00000
3·75	176·25	183 75	356 25	·287	13·490	14 064	27 267	3305	0271	·314	13·517	14·040	27 240	0233	·310	13 513	14 044	27·244	3292	02700	3280	02691	·3289	02698
7·50	172 50	187 50	352 50	·574	13·203	14·351	26 980	·6644	·0545	628	13 257	14 297	26 926	0469	·621	13 250	14·304	26 933	6569	05388	6547	05370	6564	·05384
11 25	168 75	191 25	348·75	861	12·916	14 638	26 693	·99˙3	·0813	·942	12·997	14·557	26·612	0700	·931	12 986	14 568	26 623	9814	08050	9786	08027	9805	08043
15·00	165 00	195·00	345·00	1·148	12·629	14 925	26 406	1·3150	·1077	1·256	12 737	14 817	26 298	·0927	1·241	12 722	14 832	26 313	1·3019	10679	1 2978	10646	1 3003	10666
18 75	161 25	198 75	341·25	1 435	12·342	15·212	26 119	1·6314	·1838	1 569	12·476	15 079	25·986	1152	1 550	12 457	15 097	26 004	1 6164	13259	1 6114	13218	1·6147	13215
22·50	157·50	202 50	337·50	1·722	12·055	15·499	25·832	1·9403	·1592	1·881	12·218	15·340	25 674	1370	1 859	12·192	15 360	25 695	1 9239	15782	1 9175	15729	1 9219	·15765
26 25	153·75	206·25	333·75	2 009	11 768	15·786	25·545	2 2414	1839	2·193	11·952	15·602	25 361	1583	2 167	11 926	15 628	25 387	2 2236	18240	2 2167	18183	2 2214	18222
30 00	150·00	210 00	330 00	2·296	11·481	16 073	25·258	2 5333	·2078	2 504	11·689	15 867	25·050	1789	2 475	11 660	15 894	25 079	2 5147	20628	2·5069	20564	2 5122	20607
33·75	146·25	213 75	326·25	2·583	11·194	16 360	24 971	2·8133	·2308	2·814	11 425	16 129	24 740	1986	2·782	11 393	16 161	24 772	2 7942	22921	2 7855	22849	2 7914	22898
37·50	142·50	217·50	322·50	2·870	10·907	16·647	24·684	3·0811	2527	3 123	11·160	16 394	24 431	2176	3 088	11 124	16 429	24 466	3 0619	25117	3 0522	25037	3 0589	·25092
41·25	138·75	221 25	318·75	3·157	10·620	16 934	24·897	3 3355	·2786	3·439	10·894	16·660	24 123	2355	3 392	10 855	16 699	24 162	3 3164	·27204	3 3061	27120	3 3180	27176
45·00	135·00	225·00	515·00	3·444	10·333	17·222	24 110	3 5750	·2932	3·736	10·626	16 928	23 817	·2524	3 696	10·585	16 970	23 858	3 5564	29173	3 5453	29082	3 5528	29143
48 75	131·25	228·75	311·25	3 731	10·046	17 509	23·823	3 8003	·3117	4 044	10·858	17 196	23 511	2683	3 999	10 314	17 240	23 555	3 7819	31023	3 7697	30923	3 7778	30989
52 50	127·50	232·50	307·50	4·018	9·789	17 796	23 535	4 0092	·3289	4·347	10·088	17 466	23 207	2831	4 301	10 042	17 513	23 247	3·9919	32746	3 9794	32643	3 9880	32718
56·25	123·75	236·25	303 75	4·305	9 472	18·083	23·249	4·2008	·3446	4·660	9 816	17 137	22·904	·2966	4 602	9 769	17 785	22 952	4 1844	34325	4 1714	34218	4 1800	34288
60 00	120 00	240 00	300·00	4 592	9 185	18·370	22 962	4·3750	3589	4·950	9·542	18 010	22·603	3089	4 901	9 4 3	18 060	22·653	4 3594	35760	4 3453	35614	4 3550	35724
63 75	116·25	243·75	296 25	4·879	8 898	18·657	22·675	4·5284	·3715	5·250	9 268	18·285	22·304	3198	5 199	9 217	18 337	22 355	4 5150	·37036	4 5019	·36929	4 5097	36998
67 50	112·50	247·50	292·50	5 166	8 611	18·944	22 388	4 6655	·3827	5 549	8·993	18 560	22·005	·3294	5·495	8 939	18 019	22 059	4 6517	38158	4 6369	38036	4 6469	38118
71 25	108 75	251·25	288 75	5·453	8·324	19·231	22·101	4·7805	3921	5·845	8 716	18 839	21 709	·3376	5·791	8·661	18 893	21 763	4 7678	39110	4 7528	38987	4 7628	39069
75·00	105 00	255 00	285 00	5·740	8·037	19 518	21 814	4·8755	3999	6·140	8·436	19 118	21 414	·3442	6 084	8 381	19·173	21 470	4 8636	39896	4 8478	·39766	4 8583	39852
78 75	101 25	258·75	281 25	6 027	7 750	19 805	21 527	4·9497	·4060	6·433	8·155	19 399	21 121	3495	6·377	8 100	·19 455	21 177	4 9361	40491	4 9228	40381	4 9358	40488
82 50	97 50	262·50	277·50	6·314	7·463	20 092	21 240	5 0036	4·104	6 725	7·873	19·682	20·830	3533	6 668	7 816	19 758	20 887	4 9928	40956	4 9769	40625	4 9878	40915
86 25	93 75	266 25	273·75	6·602	7 176	20 879	20 953	5·0358	·4131	7 014	7·589	19 966	20 539	3556	6 957	7·531	20·023	20 597	5 0254	·41220	5 0064	41067	5 0169	41153
90·00	90·00	270 00	270·00	6·889	6 889	20·666	20 666	5·0461	·4139	7 303	7·303	20·252	20 252	3563	7·245	7 245	20 310	20 310	5 0353	41304	5 0192	41172	5 0294	41256

SECTION iv.—*Computation of number of days comprised in each solar month.*

199. The days in each solar month are obtained from the number of days in the solar year up to the moment of each sankrânti entered in section **a** of the Eye-table. The manner in which these days are fixed is by no means simple ; but it can be understood with some little trouble by reference to special Sun-table I which was explained above It will be seen from that table that the sun's anomaly at the moment of commencement of the mean solar year K.Y. 4200 was by Sûrya siddhânta 282·7314°, and that the sun's anomaly for the corresponding day in K.Y. 4300 was 282·7282°. The difference is ·0032° for a hundred years or ·0022 for two-thirds of a century. Consequently at the commencement of mean solar year K.Y. 4267, the sun's mean anomaly was 282·73241°. The equation for this anomaly, or śodhya in degrees is, according to special Table I and all the authorities, 2·1385° ; but Mr. Dikshit, for some unaccountable reason, as admitted by his joint-author, Mr. Sewell, at page 15 of his *Indian Chronography*, adopted 2·13943644° as the śodhya by Sûrya siddhânta for K.Y. 4238. The figure adopted by Mr. Dikshit will not become true for Sûrya siddhânta till somewhere about 10,000 K.Y. or A.D. 7000. Mr Dikshit must have had some reason for this extraordinary assumption, but it may be presumed, in the case of such a well-known system as the Sûrya siddhânta, which had been in use for hundreds of years, that there was a general consensus or tradition among Indian astronomers as to the number of days comprised in each solar month, and that Mr. Dikshit adjusted his figures in some way to suit the general tradition. In any case, it would be very unsafe to attempt to recalculate the lengths of the solar months so as to suit the correct śodhya for K.Y. 4238, and to run counter to what must be presumed to be the traditional lengths of the solar months under the Sûrya siddhânta; and the object of the present work is to expound in plain language results acted on by Indian astronomers and calendar-makers during the epigraphical period, not to correct those results on account of any error, real or presumed.

200. It being given, then, that the mean anomaly of the sun at 0 day *mean* solar year in K.Y. 4267 was 282·73241° and that the equation for this anomaly or śodhya in degrees was 2·13944°, therefore, the mean anomaly of the sun at 0 day *true* solar year was 282·73241° — 2·13944°=280·59297°. From this we have the following successive stages of anomaly and equation, which enable us to calculate the moment of entry of the sun into each sankrânti by Sûrya siddhânta. It will be seen that all the stages of the anomaly and all the equations given below are extracted from Professor Jacobi's tables reproduced in columns 1 to 4 and 19 of special Sun-table II, pages 79 and 80 supra.

Sun's anomaly.	Mean longitude of sun in degrees.	Equation in degrees.		True longitude of sun.	
280·59297°	— 2·13944	+ 2·13914°			
307·50000°	+ 24·76759	+ 1·73472	Diff. ·08917°	26·50231°	Diff 3·66083°
311·25000	+ 28·51759	+ 1·64555		30·16814°	
341·25000	+ 58·51759	+ ·71055		59·22814°	
345·00000	62·26759	+ ·57333		62·84092	
11·25000	88·51759	— ·43278		88·08481	
15·00000	92·26759	— ·57333		91·69426	
41·25000	118·51759	— 1·44639		117·07120	
45·00000	122·26759	— 1·54917		120·71842	
71·25000	148·51759	— 2·06278		146·45481	
75·00000	152·26759	— 2·10305		150·16454	
101·25000	178·51759	— 2·13444		176·38315	
105·00000	182·26759	— 2·10805		180·16454	
131·25000	208·51759	— 1·64555		206·87204	
135·00000	212·26759	— 1·54917		210·71842	
161·25000	238·51759	— ·71055		237·80704	
165·00000	242·26759	— ·57333		241·69426	
191·25000	268·51759	+ ·43278		268·95037	
195·00000	272·26759	+ ·57333		272·84092	
221·25000	298·51759	+ 1·44639		299·96398	
225·00000	302·26759	+ 1·54917		303·81676	
247·50000	324·76759	+ 2·01389		326·78148	
251·25000	328·51759	+ 2·06278		330·58037	

201. Our object being to discover the moment of the Indian solar year when the sun enters each sankrānti, i.e., when his true longitude is 30°, 60°, 90°, etc., up to 360°, we shall first endeavour to find out when exactly he reaches 30° true longitude. We see from the first two lines of the above table that when the sun reaches 26·50231° true longitude his mean longitude is 26·50231° – 1·73472°, and when his true longitude is 30 16314°, his mean longitude is 30·16314° less 1·64555°. As these figures are taken from two successive stages of the sun's anomaly according to column 4 of Sun-table II (page 79 supra), his equation at any point between the two stages is assumed to be in proportion to the difference between the equation of the first and the equation of the second stage. In other words, when the sun reaches 30° true longitude, his mean longitude will be

$$= 30° - \left(1{\cdot}64555 + {\cdot}16314 \times \frac{{\cdot}08917}{3{\cdot}66083}\right)$$
$$= 30° - (1{\cdot}64555 + {\cdot}16314 \times {\cdot}024358)$$
$$= 30° - (1{\cdot}64555 + {\cdot}003973376412)$$
$$= 30° - 1{\cdot}64953°$$
$$= 28{\cdot}35047°$$

This then, viz., 28·35047° is the sun's mean longitude when his true longitude is 30°. In order to know the number of days of the solar year that must have elapsed when the sun reaches 28·35047° mean longitude we must find his distance at this moment from the point when he commences the true Indian solar year. We know that the distance from the latter point to 0° mean longitude is the sodhya in degrees, i.e., 2 13944°. Therefore the sun's mean longitude reckoned from the commencement of the Indian solar year to mean longitude 28·35047° = 28·35047° + 2·13944° = 30·48991.°

(1) Now the sun takes $\frac{365{\cdot}258756481}{360}$ or 1·014607 days to travel one degree of mean longitude.

∴ For 30·48991° of mean longitude he takes 30·48991° × 1·014607 = 30·93527611537 days. This is the number of days consitituting Mēsha month (Tamil *Chittirai*) according to Sūrya siddhānta.

Dikshit's corresponding figure is 30·93527 days, which is identical with the result reached by the present method.

For the remaining sankrāntis we may omit the explanation which is the same as the above and simply give the working.

(2) When the sun reaches 60° true longitude, his mean longitude is

$$60° - \left({\cdot}57333 + 2{\cdot}84092 \times \frac{{\cdot}13722}{3{\cdot}61278}\right)$$
$$= 60° - ({\cdot}57333 \times 2{\cdot}84092 \times {\cdot}0379868) = 60° \quad ({\cdot}57333 + {\cdot}1079032)$$
$$= 60° - {\cdot}68124° = 59\ 31876.$$

Now (59·331876° + 2·13944°) × 1·014607 = 62·35594021954 days
Dikshit's result = 62·3555 days

Difference ·0004 day

(3) When the sun reaches 90° true longitude, his mean longitude is

$$90° + \left({\cdot}57333 - 1{\cdot}69426 \times \frac{{\cdot}14055}{3\ 60945}\right) = 90° - ({\cdot}57333 - 1{\cdot}69426 \times {\cdot}038925)$$
$$= 90° + ({\cdot}57333 - {\cdot}06595) = 90° + {\cdot}50738° = 90{\cdot}50738°.$$

Now (90°·50738 + 2·13944) × 1·01407 = 94·00011209974 days.
Dikshit's result = 94·00028 days.
Difference ·00017 day.

(4) When the sun reaches 120° true longitude, his mean longitude is

$$120° + \left(1{\cdot}54917 - 0\ 71842 \times \frac{{\cdot}10282}{3{\cdot}64722}\right) = 120° + (1{\cdot}54917 - {\cdot}71842 \times {\cdot}02819°)$$
$$= 120° + (1{\cdot}54917 - {\cdot}02015) = 120° + 1{\cdot}52892° = 121{\cdot}52892°.$$

Now (121·52892 + 2·13944) × 1·01461 = 125·475154 days.
Dikshit's result = 125·4755 days.
Difference ·0004 day.

(5) When the sun reaches 150° true longitude, his mean longitude is

$$150° + \left(2{\cdot}10305 - {\cdot}16454 \times \frac{{\cdot}04\ 27}{{\cdot}26955}\right) = 150° + (2{\cdot}10305 - {\cdot}16454 \times {\cdot}010855)$$
$$= 150° + (2{\cdot}10305 - {\cdot}001786) = 150° + 2{\cdot}10127 = 152{\cdot}10127°.$$

Now (152·10127 + 2·13944) × 1·01461 = 156·494167 days.
Dikshit's result = 156·49417 days.

(6) When the sun reaches 180° true longitude, his mean longitude is
$180° + \left(2{\cdot}10305° + {\cdot}16454 \times \frac{{\cdot}03189}{3{\cdot}78189}\right) = 180° + (2{\cdot}10305° + {\cdot}16454 \times {\cdot}0083°)$.
$= 180° + (2{\cdot}10305° + {\cdot}001366°) = 182{\cdot}10442°$.
Now $(182{\cdot}10442 + 2{\cdot}13944) \times 1{\cdot}01461 = 186{\cdot}935663$ days.
Dikshit's result = 186·93555 days.

(7) When the sun's true longitude is 210°, his mean longitude is
$210° + \left(1{\cdot}54917 + {\cdot}71842 \times \frac{{\cdot}0963}{3{\cdot}84636}\right) = 210° + (1{\cdot}54917° + {\cdot}71842 \times {\cdot}09638 \times {\cdot}26)$
$= 210° + 1{\cdot}54917° + {\cdot}06924 \times {\cdot}26° = 210° + 1{\cdot}54917° + {\cdot}018024°$
$= 211{\cdot}56719°$.
Now $(211{\cdot}56719 + 2{\cdot}13944) \times 1{\cdot}01461$ days $= 216{\cdot}8288838643$ days.
Dikshit's result = 216·82888 days.

(8) When the sun's true longitude is 240°, his mean longitude is
$240° + \left({\cdot}57333 + 1{\cdot}69426 + 13722 \times \frac{1}{3{\cdot}88722}\right)$
$= 240° + {\cdot}57333 + 1{\cdot}69426 + {\cdot}035295 = 240° + {\cdot}57333° + {\cdot}05980°$
$= 240{\cdot}63313°$.
Now $(240{\cdot}63313 + 2{\cdot}13944) \times 1{\cdot}01461$ days $= 246{\cdot}319477$ days.
Dikshit's result = 246·31916 days.

(9) When the sun's true longitude is 270°, his mean longitude is
$270° - \left({\cdot}57333 - 2{\cdot}84092 \times \frac{{\cdot}14055}{3{\cdot}89055}\right) = 270° - ({\cdot}57333 - 2{\cdot}84092 \times {\cdot}03613)$
$= 270° - ({\cdot}57333 - {\cdot}10263)° = 270° - {\cdot}47070° = 269{\cdot}5293°$.
Now $(269{\cdot}52930 + 2{\cdot}13944) \times 1{\cdot}014607$ days $= 275{\cdot}637005$ days.
Dikshit's result = 275·63694 days.

(10) When the sun's true longitude is 300°, his mean longitude is
$300° - \left(1{\cdot}54917° - 3{\cdot}381676 \times \frac{{\cdot}10282}{3{\cdot}85278}\right)$
$= 300° - (1{\cdot}54917° - 3{\cdot}81676 \times {\cdot}02668) = 300° - (1{\cdot}54917° - {\cdot}101831°)$
$298{\cdot}55266°$.
Now $(298{\cdot}55266 + 2{\cdot}13944) \times 1{\cdot}014607$ days $= 305{\cdot}084309$ days.
Dikshit's result = 305·08499 days.

(11) When the sun's true longitude is 330°, his mean longitude is
$330° - \left(2{\cdot}06278° - {\cdot}58037 \times \frac{{\cdot}04889}{3{\cdot}79889}\right)$
$= 330° - (2{\cdot}06278 - {\cdot}58037 \times {\cdot}01287)$
$= 330° - (2{\cdot}06278° - {\cdot}00747) = 330° - 2{\cdot}05531 = 327{\cdot}94469°$.
Now $(327{\cdot}94469 + 2{\cdot}13944) \times 1{\cdot}014607$ days $= 334{\cdot}90566888$ days.
Dikshit's result = 334·90555 days.

(12) We know that when the sun's true longitude is 360°, he has completed 365·258756 days of the Indian solar year.

202. *Duration of solar months by Siddhānta Śiromani and Brahma siddhānta.*—The above calculations for Sūrya siddhānta will have shown that the method there followed is correct for the purpose of ascertaining the duration of solar months by Sūrya siddhānta for the epoch K.Y. 4267. So far as the writer is aware, there is no recognized list showing the duration of solar months by the Siddhānta Śiromani either in Mr. Dikshit's *History of Indian Astronomy* or anywhere else. The writer, therefore, used for the Siddhānta Śiromani the method already tried by him successfully for the Sūrya siddhānta, taking of course the equations from column 9 of special Sun-table II (page 79 supra) and fixing the duration of solar months by Siddhānta Śiromani for the epoch K.Y. 4280 which was selected by the writer: and he arrived at the following results, with which may be compared the results recently published by Mr. Sewell in *Epigraphia Indica* for the epoch K.Y. 4500. It will be seen that the results approximate as closely as may be expected with investigations carried on by two different writers working independently on a subject of acknowledged difficulty and not altogether free from doubt.

Siddhānta Śirōmaṇi.

Day of Indian solar year when sun enters.	By the author's method.	By Mr R Sewell's method.	Mr. Sewell's variations for K.Y. 4200	Actual variation of column 2 as compared with column 3.
(1)	(2)	(3)	(4)	(5)
	DAYS.	DAYS	FRACTION OF DAY	FRACTION OF DAY.
Mēsha sankrānti	0 000	0 000		
Rishabha sankrānti	30·9109	30 9106	+ ·00039	+ 0003
Mithuna sankrānti	62 3111	62 3092	+ ·0019	+ ·0019
Karkataka sankrānti	93·8312	93·92984	+ ·0017	+ ·0014
Simha sankrānti	125 4213	125·42065	+ ·00027	+ 0006
Kanya sankrānti	156 4805	156·48109	− 00072	- ·0006
Tula sankrānti	186·9562	186 95819	- ·0014	— 0020
Vrischika sankrānti	216·8699	216 87306	— ·0034	— 0032
Dhanus sankrānti	246 3774	246·38164	- 0029	-- ·0042
Makara sankrānti	275 7160	275·7201	0033	- ·0041
Kumbha sankrānti	305 1533	305 15744	− 00105	— ·0041
Mina sankrānti	334 9385	334 9424	·00014	— 0039

N.B. The same method was used to determine the lengths of the solar months according to *Brahma siddhānta* which are entered in section **a** of the Brahma siddhānta Eye-table.

SECTION V. —*Construction of Sunrise table III.*

203. The moment of *sunrise* for any latitude and longitude in India can be ascertained by means of Table III based on the rules and table of *asus* given by Professor Jacobi in Volume I of the *Epigraphia Indica.* Professor Jacobi has himself given detailed tables for sunrise in Volume II of the same publication, but the results achieved by means of those tables can, it is believed, be more easily reached by the present Table III. For the purpose of determining the equation of time for each day of the solar year, the sun's equation of the centre, according to Eye-table **h** was used, with the sign changed: likewise the *asus* given in Professor Jacobi's table and reproduced in paragraph 125, page 44 supra, had to be suitably modified.

Thus (according to Professor Jacobi's table) in the 10th degree of northern latitude 30 degrees of sign 1 of the zodiac take 1544 *asus* or 1544 × 4 seconds of time to rise; or in lunation-longitude,

$\left(\frac{30}{360}\right) \times 29{\cdot}53059$, or 2·46088 units of space take 1544 × 4 seconds of time to rise;

$$\therefore \text{ 1 unit of space takes } \frac{1544 \times 4}{2{\cdot}46088} = 1544 \times 1{\cdot}62 = 2{,}510 \text{ seconds.}$$

This 2,510 then, is the factor by which each day's equation of the centre according to Eye-table **h** should be multiplied (so long as the sun is in the first sign) in order to give that day's equation of time.

And generally, all the *asus* in Professor Jacobi's table were multiplied by $\frac{4}{2{\cdot}46088} = 1{\cdot}62$, and the factors thus obtained were multiplied again by each day's equation according to Eye-table **h** in the present work: the result was each day's equation of time in seconds as entered in Table III of this work. The same result could of course have been arrived at directly from Table IVC "Sun's equation in degrees for each day of solar year."

204. In the present Table III, the moment of sunrise for any day of any solar year is obtained by simply adding a figure in the column "Tropical longitude" to the figure opposite the given day of the solar year in the column "Equation of time"; and the result is the correction, in seconds of time, to be applied to mean sunrise at Lanka (6 a.m.) to determine the local sunrise for the given latitude.

SECTION VI.—*Determination of test tithi by different siddhāntas.*

Example.—Āshāḍha Śukla 12, Kaliyuga 3585 (expired), A.D. 484.

205. A single test problem, the same as that worked out by Mr. Dikshit in the Introduction to DR. FLEET'S *Gupta Inscriptions* as well as by Professor Jacobi in

Volume I of *Epigraphia Indica*, will suffice to demonstrate the absolute reliability and extreme simplicity of the above processes as carried out in the present work. The problem is to determine the ending moment of *Āshāḍha śukla dvādaśī* in *Kaliyuga* 3585 (expired), A.D. 484. The ending moment has to be determined (*a*) for Laṅkā and (*b*) for the latitude and longitude of Eran (Lat. 24°, Long. 78° 15′). Lastly, the problem has to be worked out, first according to the *Sūrya siddhānta*, and then according to the *first Ārya siddhānta*, and then according to Siddhānta Śiromaṇi and Brahma siddhānta.

Sūrya siddhānta.

References to tables.	Days of solar year	Moon's mean anomaly in days.
(Table II): Kaliyuga 3585, A.D. 484, * March 18·2212		
First new moon in solar year	24·3900	4·494
Eye-table **y** Āshāḍha śukla 12	70·8734	15·764
	95·2634	20·258
		(☉'s Eqn.)—·0454
Eye-table **h**: ☉'s Eqn. for 95·26 days of solar year = ...	— ·0454	
Eye-table **e**: ☾'s Eqn. for anomaly of 20·212 days = ...	+ ·4138	20·212
	+ ·3684 + ·3684	
* English month, day, and fraction of day marking commencement of solar year .	95·6318	
	* March 18·2212	
	113·8530	

Our result is: the tithi ended at ·8530 of a day, i.e., (by Table VI) at 51 ghaṭikas 11 palas on the 113th day of the English calendar, counting from 1st March.

206. The reader will be pleased to note that this absolutely correct result for the ending moment of a tithi is obtained by *simply adding* up six or seven figures from Table II and the Eye-table and that absolutely no other process is required for any tithi in any year.

Now, by Eye-table section **q**, the 113th day of the English calendar, counting from 1st March, is 21st June;

by Table VI, ·8530 of a day = 51 ghaṭikas 11 palas;

by Eye-table **j** we arrive at the week-day as follows:—

co-efficient of A.D 400	2
co-efficient of odd year 84 ...	0
co-efficient of June	3
day of the month	21
	26

Since 26, divided by 7, leaves remainder 5 = THURSDAY, the final answer is THURSDAY, 21ST JUNE, A.D. 484, 51 GHATIKAS 11 PALAS after mean sunrise at Lanka.

Note.—This is the absolutely correct ending moment, according to Mr. Dikshit; but Professor Jacobi arrives at a result which is 4 palas short. To arrive at the latter result, ☾'s + ☉'s Eqn. must be added to ☉'s Anom. before ascertaining ☉'s Eqn., just as ☉'s Eqn. is in the actual working supra, added to ☾'s anom. before ascertaining ☾'s Eqn. This extra step, however, is a nicety seldom required in practice, since the error on this account can never exceed 6 palas.

207. *To determine the ending moment of the above tithi in true local time at Eran.*—We first of all (v. pp. 40, 41 *supra*) find the sun's sidereal longitude for 95·85 days, for which purpose we deduct the *śodhya*, 2·17 days. Remainder, 94 days nearly.

We turn to Table III and bring down the entry under latitude 24° corresponding to the 94th day of the solar year, for ☉'s trop* long. and the entry corresponding to the 95th day for the equation of time.

* *Note*.—In the solar year, K.Y. 3585 we make no correction for the difference between ☉'s sidereal and tropical longitude because in K.Y. 3600, i.e., only 15 years later, the ☉'s sidera coincided with the ☉'s tropical longitude.

(1) Equation of time (95th day) : + 148 seconds of time.

(2) ☉'s tropical longitude (94th day) : + 2,647 seconds of time.

(3) To these figures from Table III we add the time difference for the longitude of Eran (+2·53 degrees Ujjain longitude), namely, + 2·53 × 240 or + 608 seconds of time. Total : + 148 + 2647 + 608 = + 3,403 seconds of time.

Now 3,403 seconds of time, divided by 60, are 56 minutes 43 seconds or ·0393 of a day. Adding this to the mean Lanka time already arrived at, viz., ·8529, we obtain, as TRUE LOCAL TIME at ERAN for Āshādha śukla 12, Kaliyuga 3585, ·8922 of a day or 53 GHATIKAS 32 PALAS which is exactly the same as Mr. Dikshit's result at page 157 of DR. J. F. FLEET'S *Gupta Inscriptions*.

208. *According to first Ārya siddhānta—same tithi calculated by other siddhāntas.*—Mr. Dikshit (*loc. cit.*) worked out the ending moment of the same tithi by the Brahma siddhānta, the Siddhānta Śiromani, and the first Ārya siddhānta. It will be shown, in the illustrative examples appended to the Brahma siddhānta Eye-table that the results for the above tithi according to the present writer's method agree identically with Mr. Dikshit's results for Siddhānta Śiromani as well as for Brahma siddhānta. It remains to test the accuracy of the present method by the first Ārya siddhānta.

	Commencement of Ind. Solar Year	Sun's anomaly.	Moon's anomaly	
A.D. 400	March 17·49305 ...	23·82154 ...	21·4181	Equation.
84 years	·72917 ...	0·55681 ...	13·4954	
		24·37835 ...	24·3783	
			59·2918	
			55·1092	(2 anomalistic months).
			4·1826	
Eye-table y Āshādha Su. 12	...	70·8734 ...	15·764	
	March 18·2222 ...	95·6517 ...	19·946	
Sun's Eqn. for 95·62 days	... ..	... ...	—·0429	
			19·903	Eqn. + ·4111
Sun's Eqn. for 95·62 days + 41 (☾'s Eqn.) ..		. . ...	...	☉'s Eqn — ·0441
				+ ·3670
Sum of ☉'s + ☾'s Eqn.	+ ·3670 ...	... . + ·3670		
		March 18·2222		
		March 113·8409		

The tithi ended according to the present method at ·8409 of the day, i.e., at 50 ghatikas 27 palas after mean sunrise whereas Mr. Dikshit's result for the same siddhānta is 49 ghatikas 48 palas, a difference of 39 palas. This difference, though ordinarily negligible, is somewhat surprising when it is considered that by three other siddhāntas the present writer has reached results identical with Dikshit's and if only for this reason, it requires explanation.

209. The explanation is to be found in Professor Jacobi's statement at page 450 of *Epigraphia Indica*, Vol. I, that the distance of sun from moon is the same in Ārya as in Sūrya siddhānta up to K.Y. 3600. The distance of sun from moon is the same as the mean ending moments of tithis. The reason for this assumption may be conjectured to be this, that the Indian astronomers of the sixth century A.D. were content to rely on the *Sūrya siddhānta* for retrospective mean calculations, there being no object in making them separately by the Ārya siddhānta. If we make this assumption, we have to go back to the figures already worked out by the Sūrya siddhānta and adopt 95·2634 as the interval from the beginning of the solar year to the end of Āshādha śu. 12. From this we must deduct the difference between the Ārya and Sūrya siddhānta śodhyas (2·1707 *minus* 2·1468 =) ·0239 day, because the Sūrya siddhānta true solar year begins ·0239 day earlier than

the Ārya siddhānta true solar year and, therefore, the interval from the commencement of the Ārya siddhānta year to the mean ending moment of any tithi must, *cæteris paribus*, be less by ·0239 day.

Then our figures by Ārya siddhānta will be—

Commencement of Ind. solar year A.D. 484 .. ... March 18·2222.

Add, for interval up to Āshāḍha *ś* 12, 95·2634 days less ·0239 day = ... 95·2395.

Sun's Eqn. by Ārya siddhānta for 95 24 days = —·0418.

Moon's Eqn. will have to be modified by adopting Sūrya siddhānta figures so far as tithi ending moments are concerned.

Moon's anomaly for the ending moment of tithi will therefore be—

21·4181 (Ārya siddhānta, fig. on page 87).—☾'s An. at commencement of the Indian solar year.

13·4954 (Ārya siddhānta, fig. on page 87).—Eye-table p, addition for 84 years.

24·3661 (*i e.*, 24·3900, Sūrya siddhānta, figure on page 86 for interval between commencement of Indian solar year and first new moon in solar year less sodhya difference, ·0239.)

15·764 (Eye-table y, addition to ☾'s anomaly for Āshāḍha, sukla 12.

75·043

55·109 (two anom. months).

19·934

— ·0418 (☉'s equ.)

19·892 days.

☾'s Eqn. for this anomaly is + ·4110.

Sum of ☉'s and ☾'s Eqns. + ·4110 — ·0418 ... .. + ·3682

March 113·8299

The ending moment of the tithi is now ·8299 which is 49 ghatikas 48 palas and is identical with Mr. Dikshit's result (page 157 of Dr. J. F. FLEET's *Gupta Inscriptions*).

SECTION vii.—*Construction of Tables for nakshatras and yogas—Eye-table, sections* **S** *to* **X**.

210. The method of using these tables having been already explained (paragraphs 57 and 58), it remains to state how they were constructed.

The longitude of the moon may, for many purposes in astronomy, be arrived at by the formula (moon's longitude — sun's) + sun's longitude = moon's longitude. "Moon's longitude *minus* the sun's" is the tithi; and at the first new moon in the solar year, as at any other new moon, "moon's longitude — sun's" = 0. Therefore at this moment the sun's longitude is also the moon's longitude, and to determine the nakshatra appropriate to this moment it is only necessary to convert the sun's longitude into days of the solar year. The sun's longitude is reckoned from the 0 point of the mean solar year which is later than the 0 point of the ordinary or true Indian solar year by the śodhya given in special sun Table I in this chapter (page 78). We follow the Sūrya siddhānta for which the śodhya, resting on the authority of Mr. Dikshit (paragraph 199 *supra*) is 2·170694 days (or 2·1394364 degrees). The sun's mean longitude in days is, therefore, given by the formula (i—2·170694) where i is the interval in days between the commencement of the Indian solar year and the first new moon in the solar year.

This can be converted into degrees of longitude by multiplying the above formula by ·9856, which is the fraction of a degree accomplished by the sun in a day or $\left(\frac{360°}{365 \cdot 25876}\right)$.

Now this being also the moon's longitude at the moment of the first new moon in the solar year we have, at the rate of 13° 20′ for each nakshatra, the

following expression for the number of nakshatras and fraction of a nakshatra completed at this moment:—

$$\frac{(i-2\cdot170694)\times\cdot9856^{\circ}}{13\cdot33^{\circ}}.$$

When i is a maximum, i.e., 29·530588 days, the above expression becomes

$$\frac{26\cdot966016^{\circ}}{13\cdot33^{\circ}}=\frac{40^{\circ}-13\cdot033^{\circ}}{13\cdot33^{\circ}}=3-\frac{13\cdot033}{13\cdot33};$$

because 3 nakshatras cover 40° of longitude and 26·966016° are equal to 40° — 13·033°. Since a degree of moon's longitude is accomplished in $\frac{27\cdot32166}{360}$ or ·0759 of a day, the time required for 13·033° to be accomplished is 13·033 × ·0759 = ·9892 of a day. In other words when i is a maximum, the interval from the first new moon in the solar year to the ending moment of the 3rd nakshatra or *Krittikā* is ·9892 of a day. That is why section **s** of the Eye-table (page 156) opens with the entry "3rd nakshatra . . ·9892 of a day" and the mean ending moment of every successive nakshatra is arrived at by successively adding 1·01191 day, the mean duration of a nakshatra.

211. This is the shortest interval from first new moon in the solar year to the ending moment of nakshatra *Krittikā*: for it will be seen that as i in the above expression is diminished the remainder arrived at by deducting (i — 2·170694) × 9856° from 40° will be increased, in other words the interval from first new moon to end of nakshatra Krittikā will be increased. The figures in section **t** of the Eye-table are arrived at by substituting 1, 2, 3 . . . up to 29 days for i in the expression (i — 2·170694) × ·9856°.

212. Similarly, for yogas the formula is, (moon's — sun's longitude) + 2 × sun's longitude = moon's yoga longitude: and the Yoga table, section **v** of the Eye-table, is constructed accordingly.

213. It will also be seen that the main difference between the nakshatra and yoga-tables for one siddhānta and those for other siddhāntas arises from the difference of *śodhya*.

CHAPTER V.—PLANETS, PLANETARY AND ECLIPSE CHRONOLOGY.

SECTION i.—*Calculation of planets' mean and geocentric places.*

214. The mean sidereal periods, used in Table IV, are those of modern European astronomy adjusted, as explained below, to the Indian sidereal year. The following table compares the sidereal period of each planet, by Sūrya siddhānta without *bīja*, with that adopted in this work as well as with the results of modern astronomy. A full explanation of the difference between columns 3 and 4 is furnished in paragraphs 217 to 220 below:—

Planet.	Sūrya siddhānta without *bīja*.	Modern astronomy (Encycl. Brit.).	Figure adopted in this work.
Col. 1.	Col. 2.	Col. 3.	Col. 4.
	DAYS.	DAYS.	DAYS.
Mars	686·99749	686·979702	686·98818
Mercury	87·969702	87·969256	87·96939
Jupiter	4332·3206	4332·58479	4332·92495
Venus	224·698568	224·700798	224·70170
Saturn	10765·7780	10759·2010	10761·2795

215. In the first place it was thought unnecessary to observe in regard to planetary sidereal periods the same scrupulous adherence to Indian authorities which is incumbent in the case of the solar year and the synodical month. In the next place, the difference between Indian and modern astronomy in the length of the sidereal year results in a slight displacement of the starting point of Indian celestial longitudes, which displacement amounts to 7′ 4·96″ in 50 years and should be added to the precession,* amounting at the present epoch, according to modern astronomy, to 41′ 52·27″ for fifty years. The total difference between Indian sidereal and modern tropical longitudes is thus 48′ 57·23″ for 50 years or 59″ per annum, while Bhāskara's estimate of the precession, 59·9007″ per annum, is only slightly larger.

216. If the slight annual displacement of the zero point of Indian longitudes, which is a practical postulate of Indian astronomy, however unrecognized in theory, is applied to the sidereal places of planets, their mean sidereal periods will have to be altered as shown in column 4 of paragraph 214 above. In this manner alone will it be possible to apply to the planets the same precession as is applied to the sun, for the purpose of converting sidereal into tropical longitude.

N.B.—By taking this slight liberty with the mean sidereal periods of planets, the exact agreement of the mean place of any planet with its place in modern astronomy is secured, and the serious divergences between the two systems, commented on in Whitney's notes on the *Sūrya siddhānta* have been effectually avoided. As a result, the place, whether mean or actual, assigned to any planet in Table IV, may not tally exactly with Indian calculations, unless the corrections indicated in paragraph 297 below are made; but the difference will generally be found to be very slight, while there is an obvious advantage in having for every possible epoch a mean place for each planet, identical with that assigned to it by modern astronomy.

217. The reader may be desirous of being furnished with a somewhat fuller explanation of the expression "the slight annual displacement of the zero point of Indian longitudes." In the *Encyclopædia Britannica*, 11th edition, Volume 13, page 492, the lengths of the sidereal year in Indian and in modern European astronomy are compared as follows:—

Sūrya siddhānta,	365 d.	6 hrs.	12 min.	36·56″
Modern astronomy	365 d.	6 hrs.	9 min.	9·60″

The difference between the two lengths of the sidereal year is ·00239537 of a day. When the sun has completed a sidereal year according to modern astronomy, he is still assumed in the Sūrya siddhānta to continue to move on for ·00239537 of a day before completing his sidereal orbit; and during this space of time he describes, by modern astronomy, $\cdot 98560901 \times \cdot 00239537 = \cdot 002360898$ of a degree. In consequence, the 0° point of Indian celestial longitude, which in theory is supposed to be absolutely fixed in the heavens, is actually shifted every

* An investigation of the precessional correction, necessary to convert Indian sidereal into European tropical longitudes will be found in the second paper in the appendix: "Luni-solar precession as applied to Indian astronomy."

year, so far as the sun is concerned, by ·002361 of a degree. For 1,400 years this shift amounts to 3·3054 or a little less than 3⅓ degrees. If, according to the general opinion of historians of Indian astronomy, the sun was at the 0 point of longitude and in *Zēta Piscium* on or about 18 March A.D. 532, his present 0 point in A.D. 1932 is, according to Indian astronomy, 3⅓ degrees to the east of *Zēta Piscium.*

218. The practical consequence of this shift is that a planet which was with the sun in *Zēta Piscium* and in 0° longitude on 18 March A.D. 532, and which during the last 1,400 years has, by modern astronomy, completed a certain *integral* number of revolutions, must in A.D. 1932, i.e., at the end of exactly 1,400 years and exactly at the end of the last of those revolutions, be *ex hypothesi* with the sun again in *Zēta Piscium*; but in Indian astronomy such a planet would still be 3⅓ degrees short of a conjunction with the sun, because the sun's 0 point of longitude had in the interval of 1400 years moved 3⅓ degrees away to the east of *Zēta Piscium.* Now the 0° of longitude must in any system of astronomy be the same for the sun as for the planets, as otherwise we would be in hopeless confusion in investigating their relative positions; and therefore it is inevitable that any conventional lengthening of the sun's course in order to reach his 0 point of longitude should entail a proportionate lengthening of the sidereal course of each planet. We will now proceed to study the exact amounts by which the sidereal periods of the different planets have to be lengthened.

219. *Mars.*—The period of Mars' revolution is 1·88082 sidereal years (modern) and to keep up with the Indian sun, Mars' revolution must be carried forward by 1·88082 × ·002361° = ·00441 degree, before Mars can be said to have returned to 0° longitude. Now Mars' motion (modern astronomy) being 1·9083 days per degree, the lengthening of the sidereal period of revolution in his case is 1·9083 × ·00441 = ·0084748 day.

Add Mars' modern sidereal period :	686·979702 days.
Total sidereal period for Mars, required by Indian astronomy	686·988177 days.

That is, if we fix the sidereal period of Mars at the figure last arrived at, we shall, it is true, not arrive at his true mean sidereal longitude for any given year, particularly for remote years, but the correction to be made in order to get either his true mean sidereal longitude or his true tropical longitude will be the same as in the case of the sun. For the remaining planets, the working is given below without the explanation which is the same as in the case of Mars.

Mercury.—Rate: ·2444 day per degree; ·2408 year for one sidereal revolution (mod. astron.)

·2408 × ·002361 × ·2444 day = ...	·000139 day.
Add Mercury's sidereal period (modern)	87·969256 (mod. astr.).
Total required by Indian astronomy	87·969395 days.

Jupiter.—Rate: 12·035 days per degree; 11·8618 years for 1 sidereal revolution (mod. astron.).

11·8618 × ·002361 × 12·035 day = ...	0·33705 day.
Add Jupiter's sidereal period (modern)	4332·5879.
Total required by Indian astronomy	4332·92495 days.

Venus.—Rate: ·6242 day per degree; ·6151 year for one sidereal revolution.

·6151 × 002361 × ·6242 day = ...	0·0009065 day.
Add Venus' sidereal period (modern)	224·700798 (mod. astr.).
Total required by Indian astronomy	224·701704 days.

Saturn.—Rate: 29·8864 days per degree; 29·46 years for one sidereal revolution.

29·8864 × 29·46 × ·002361 days = ...	2·07855 days.
Add Saturn's sidereal period (modern)	10759·2010 (mod. astr.)
Total required by Indian astronomy	10761·2795 days.

220. It will strike the reader that the result of adopting periods of revolution differing from those recognized in Indian astronomy must be that in a long period of time there would be a considerable divergence between the mean longitude of a planet arrived at with the aid of the *Ephemeris* and that, for instance, implied in an ancient Indian record. To guard against such divergences, it is necessary to tabulate them from epoch to epoch, so that in a given case we may know what to expect in an Indian record. This is a precaution which should certainly not be neglected by an investigator and it will be found from the small table in paragraph 297 *infra* that the necessity for such a correction has been foreseen, and the table is made good use of in the investigation of Rama's horoscope, of which the final result is set out in paragraph 300 below. See also Table IV-B.

221. After settling the sidereal periods of revolution of the several planets, which are necessary to bring Indian astronomy into line with modern results, we have next to settle the exact quantity by which the mean longitude of each planet is increased every year. The best method of ascertaining the annual motion of a planet is to take a long synodic period, the longer the better, that is, a period after which the sun and the planet in question come very nearly together. An example will illustrate what is meant.

222. Mars' period for 193 revolns. = 193 × 686·9882 days. = 132588·7226 days.
363 Indian solar sidereal years = 363 × 365·258756 „ = 132588·9286 days.

363 years = 193 revolns. of Mars + ·2060 day.
Mars' movement in ·2060 day = ·206 × ·524 = ·107944 degree and 193 revolutions = 193 × 360 = 69480 degrees.

∴ In 363 Indian solar years, or 193 Mars' revolutions + ·2060 day, Mars' movement is 69480·107944 degrees.

∴ In one Indian sidereal year Mars' movement = $\frac{69480{\cdot}107944}{363}$ = 191·405253 degrees.

Mercury: 1,474 revolutions of Mercury = 1474 × 87·96939 = 129666·88086 days.
355 Indian sidereal years = 355 × 365·258756 ... ... = 129666·8585 days.

∴ 355 Indian solar years = 1,474 revolutions of Mercury — ·02236 day.
Mercury's movement for ·02236 day = ·02236 × 4·09233° = ·0915045 degree.
Since 355 Indian solar years = 1,474 Mercury's revolutions — ·0915045° = 530639·9084955 degrees of Mercury;
∴ In one Indian sidereal year Mercury's movement = 530639·9084955° ÷ 355 = 1494·76030562°, which (casting out multiples of 360°,) is the same as 54·76030562°.

Jupiter: 131 revolutions of Jupiter = 131 × 4332·92495 days = 567613·175 days.
1554 Indian sidereal years ... ... = 567612·108 days.

∴ 1554 Indian solar years = 131 revolutions of Jupiter — 1·067 days.
Jupiter's movement for 1·067 day = 1·067 × ·083087° = ·088653729 degree.
∴ 1,554 years = (131 × 360°) — ·088653729° = 47159·911346271 degrees of Jupiter;
∴ Jupiter's movement in 1 Indian solar year = the last figure ÷ 1554 = 30·3474383°.

Venus: 1,541 revolutions of Venus = 346265·325864 days (= 1541 × 224·701704).
948 Indian sidereal years ... = 346265·3011 days.
∴ 948 years = 1541, revolutions of Venus — ·0247 day
= (1541 × 360°)—(·0247 × 1·602 degrees) = 554760° — ·0395694° = 554759·960431° of Venus.
∴ Venus' movement in one Indian solar year = the last figure ÷ 948 = 225·189831°.

Saturn: 13 revolutions of Saturn = 13 × 10761·2795 = 139896·6335 days.
383 Indian sidereal years = 383 × 365·258756484 = 139894·103 days.
∴ 383 Indian solar years = 13 revolutions of Saturn — 2·530 days.
= (13 × 360°) — (2·530 × ·03346°) = 4680° — ·0846538° = 4679·915346° of Saturn;
The last figure divided by 383 gives Saturn's yearly movement for one Indian solar year, viz., 12·2191001 degrees.

223. From the yearly motions of the planets, fixed as above, are obtained (1) the daily motions used in calculating the increase of mean longitude of each planet for odd days of the year, see Table IV; (2) the motions of planets for odd years of a century, see Table IV and (3) the cyclic variations for different cycles, prefixed to Table V-A.

224. The planetary anomalies and annual equations, which were used for Table IV of this work, were taken from *Warren's Kāla Sankalita* and are ascribed by that author to a Telugu astronomer of the thirteenth century A.D., called *Vāviḷāḷa Kuchinna*. The tables are no doubt old-fashioned, but they are handy and sufficiently accurate for the purposes of Indian horoscope chronology. This is the main reason for resuscitating them into present-day use. The author is glad to find that so eminent an authority as Professor Jacobi of Bonn and Heidelberg has also adopted the same tables in his contribution to *Epigraphia Indica*, Volume XII. The figures as to longitudes of apses and nodes and the greatest apparent latitudes of planets (Tables IV, IV-G) are taken, partly from Warren and partly from the Siddhānta Śirōmaṇi.

225. The computation of anomalies and equations, even as simplified by Vāviḷāḷa Kuchinna, is a tedious operation for determining planetary places, especially when the number of trials required in an investigation, e.g., for Rama's horoscope (pages 118—120 below) is at all considerable. This inconvenience is altogether eliminated when Tables V-A and V-B are used, and there is hardly any problem in Indian planetary records which cannot be solved by means of those tables. Still, it is occasionally of importance to know what mean longitude corresponds to a given geocentric place of a planet on a particular day of the Indian solar year and *vice versâ*: and in one case at least, viz., that of Mars, as will be explained in paragraph 282 below, this information is indispensable in any investigation concerning that planet. For these reasons an Eye-table has been devised for each planet (vide Table IV), and the reader will do well to familiarize himself with it by studying sec. iv (pages 132—134) of this Chapter.

226. Indian astronomy reckons nine planets, spoken of collectively as *navagrahas*, namely, the Sun, Moon, Mars, Mercury, Jupiter, Venus, Saturn, Rāhu and Kētu. It will be seen that the first seven are named in the order of the days of the week, and this is nearly always the order in which they are referred to in Indian astronomy, showing that planetary week-days and planets' names came into India at the same epoch. Rāhu is another name for the moon's ascending node, one of the points at which the moon's orbit cuts that of the sun (the ecliptic), the other point, or the descending node, being called Kētu. An eclipse cannot happen except when the moon is at either node and the sun is at the same or the opposite node; hence the popular legend which depicts *Rāhu* as a dragon swallowing up the moon or the sun at the time of an eclipse. (See the quotation from Paripāḍal at page 109 below.) All the planets, except Rāhu and Kētu, move, like the sun, from west to east in their apparent path round the earth. Rāhu moves in the opposite direction, and Kētu is always assigned a position 180° from that of Rāhu. For Rāhu see Table IV-K, and for eclipses see Table IV-L, and section v of this Chapter (pages 134 to 150).

227. All the data necessary for calculating the geocentric longitude and latitude of the five planets, Mars, Mercury, Jupiter, Venus and Saturn, are given in Table IV. The actual geocentric places at any time can be deduced from Tables V-A and V-B, as shown by numerous examples in sections ii and iii of this chapter, or from the planetary Eye-tables included in Table IV.

228. The longitude of any planet is its distance, measured in degrees, from an arbitrary point in the ecliptic, which point may perhaps best be defined as the 0 point of the sun's mean longitude. The sun's *mean* longitude is always 0 at a certain part of the Indian solar year, namely, at 2·1707 days from the commencement of each Indian solar (according to the Sūrya siddhānta), while *at the moment of commencement* of the Indian solar year, the sun's *actual* longitude is 0. The difference between the sun's mean and actual longitude at any time is his equation of the centre, and this difference is due to his varying pace at different times of the year as he journeys round the earth. The sun's mean longitude and equation for every complete day of the solar year are given in Table IV-C, and these are most important data in Indian astronomy. Table IV-D gives the increase of the sun's mean longitude for hundredth parts of a day.

229. The sun's mean longitude at any moment is ascertained (in Sūrya siddhānta) by deducting 2·1707 from the number of days and fraction of day elapsed since the commencement of the Indian solar year, and applying to the result the table of sun's longitudes (Table IV-E). The difference between the sun's longitude thus calculated and the mean longitude of the sun for the same moment

given in any European *Nautical Almanac*, is the true Indian precession, and this difference should always be added to the longitude of a planet given in this work for years subsequent to A.D. 532 in order to arrive at the corresponding longitude according to the *Nautical Almanac*. The following table gives the precession to be added to Indian celestial longitudes at various epochs since A.D. 532 (when the European and Indian longitudes coincided*), in order to arrive at the European celestial longitude. The initial rate of precession adopted for this table is ·016322 of a degree per annum or 1·63 degrees for every 100 years. The exact method by which the precessional quantities tabled below have been arrived at will be found fully explained in the paper on precession appended to this work.

(The European longitude of a planet is called its *tropical* longitude from its being regulated by the tropical year, whereas the Indian longitude is generally called a *sidereal* longitude from its being regulated by the sidereal year—see further paragraph 289 below.)

A.D.	Kaliyuga	Indian precession in degrees.	A.D.	Kaliyuga.	Indian precession in degrees	A.D.	Kaliyuga	Indian precession in degrees.
532	3633	0·0	**1062**	4163	8·6	**1600**	4701	17·3
562	3663	0·5	**1100**	4201	9·2	**1632**	4733	17·9
592	3693	1·0	**1132**	4233	9·7	**1662**	4763	18·4
632	3783	1·6	**1162**	4263	10·2	**1700**	4801	19·0
662	3763	2·5	**1200**	4301	11·8	**1732**	4833	19·5
700	8801	3·0	**1232**	4333	11·4	**1762**	4863	20·0
732	3882	3·2	**1262**	4363	11·9	**1800**	4901	20·6
762	3862	3·7	**1300**	4401	12·5	**1832**	4933	21·2
800	3901	4·3	**1332**	4433	13·0	**1862**	4963	21·7
832	3953	4·9	**1362**	4468	13·5	**1900**	5001	22·2
862	8963	5·4	**1400**	4501	14·1	**1932**	5033	22·8
900	4001	6·0	**1432**	4533	14·6	**1962**	5063	23·3
932	4033	6·5	**1462**	4563	15·1	**2000**	5101	23·9
962	4063	7·0	**1500**	4601	16·7	**2032**	5133	24·4
1000	4101	7·6	**1532**	4633	16·3			
1032	4133	8·1	**1562**	4663	16·8			

230. Numerous practical applications of the foregoing observations regarding the difference between European and Indian precession will be found in sections ii and iii of this chapter when we come to compare our verification of Rama's horoscope (page 289 below) and of ancient Chinese observations (paragraph 304) with similar investigations by European astronomers. It will be explained in the same sections that though the names of Indian rāśis are merely translations of Greek names of the signs of the zodiac, yet an Indian astronomer speaking of Jupiter having been in Rishabha rāśi about 3100 B.C. does not mean the same thing as a European astronomer who says that Jupiter was in the sign of the zodiac Taurus about the same time. This difference appears to have been overlooked even by competent European astronomers like Bentley when writing about Indian horoscopes. See paragraph 291 below.

231. The reader who has carefully digested all that has been said touching the mean longitudes of planets, their yearly and daily mean motions and the precession, will probably still be puzzled a good deal to understand their actual motions as depicted in Table V-B. He will find that while Jupiter and Saturn occasionally adhere to their mean motions, namely, 12 days per degree in the case of Jupiter and 30 days per degree in the case of Saturn, the other planets do not seem to observe any particular relation between their mean longitudes investigated above and the geocentric longitudes entered in Table V-B, which are longitudes of the planets as seen from the earth and which are also the longitudes recorded in Indian horoscopes. The best plan for the general reader will be to read the text of sections ii and iii of this chapter where he will learn not only how to deal with practical problems but also how to follow the courses of the several planets through the centuries, and he will thus be enabled to form a definite picture of the successive actual movements of each planet which picture is materially different from that presented by the mean longitudes.

232. It is possible to calculate, in the manner explained in the next and subsequent paragraphs, the actual geocentric longitude of any planet at any given moment, just as it is possible to calculate, by the rules already laid down in the earlier portions of this work, the tithi and the nakshatra for any given moment.

* See Paper No. ii in the Appendix: "Luni-solar precession as applied to Indian Astronomy."

The object of this work is, however, to demonstrate that it is equally possible, by taking advantage of cycles of recurrence, to construct a ready-made Ephemeris for any number of years past or future in regard to the positions of planets as well as in regard to tithis and nakshatras. Such an ephemeris or perpetual planetary almanac for the five planets, Mars, Mercury, Jupiter, Venus and Saturn, and embracing a period of 3,000 years, from 1000 B.C. to A.D. 2000, is presented in Tables V-A and V-B, the contents of which are fully explained in sections ii and iii of this chapter.

233. Meanwhile we will explain briefly how the geocentric longitudes of planets may be rigorously computed for any given moment past or future by the rules of Indian astronomy. The method used in modern European astronomy is much more elaborate, as may be seen from any standard work on the subject, for instance. Dr. P. V. NEUGEBAUER'S *Tafeln für Sonne, Planeten und Mond* (Leipsig, 1914).

234. The mean longitude of a planet at any moment is obtained by adding together its mean longitude at the commencement of the century, the mean motion for the given odd year, and the mean motion for the given day. Thus for 202·54 days of the Indian solar year, A.D. 961 (Kaliyuga 4062) we have—

		Degrees
(Table IV)	Mars' mean longitude at commencement of K.Y. 4001 ..	79·4873
(,,)	Mars' increase of mean longitude for 61 years	155 72
(,,)	,, ,, ,, 202 days	105·85
(,,)	,, ,, ,, ·54 day	·2830
	Answer	341·34°

235. This is the mean longitude of the planet in his path round the sun, though not his longitude, as he appears to us from the earth. To obtain this, which is called the geocentric longitude, and which is the longitude usually cited in Indian time-records, we have to perform a fairly tedious sum, which however, we may, if we like, avoid by using Tables V-A and V-B or the planetary Eye-tables in Table IV.

236. The place of the moon, the only remaining planet, can be deduced either from the tithi or from the nakshatra as in paragraph 241 below

The principle applied in paragraph 241 is that—

If we find the sun's longitude at the ending moment of a tithi and add it to the moon's elongation or tithi, we shall obtain the moon's longitude, or which is the same thing, the nakshatra current at the ending moment of tithi.

237. The true geocentric longitudes of the other planets may be calculated in the following manner.—

The planets are divided into two classes: *inferior* (Mercury and Venus) and *superior* (Mars, Jupiter and Saturn). Three quantities, which we may call *a*, *b*, *v*, in the case of the inferior planets, Mercury and Venus, and A, B, N, in the case of the superior planets, Mars, Jupiter and Saturn, have to be determined first of all, before working out the actual geocentric longitude of any planet. Having determined those three quantities, the further procedure is the same, whether the planet is superior or inferior. We give below the calculations (1) for the *inferior* planets, Mercury and Venus and (2) for the *superior* planets, Mars, Jupiter and Saturn for 89 completed days of the solar year A.D. 634 (i e., half an hour after mean sunrise on 17th June A.D. 634), when there was a partial lunar eclipse in the lunar month of Āshāḍha. The Indian solar year A.D. 634, began, according to Table II, at ·0243 of the day, i.e., half an hour after mean sunrise and the 89th or any other day became complete at the same time of the day, but in the working below this half hour is neglected.

I. *True geocentric longitude of Mercury for 89 completed days of the Indian solar year A.D. 634.*

Time and English date, mean sunrise on 17*th June A.D.* 634.

(1)—*a*. Mean longitude of planet *minus* mean longitude of sun.

Mean longitude of Mercury		Mean longitude of sun. (Table IV-C)		Venus' mean longitude.	
For A.D. 600	305·49°	89 days	85·58° *v*	A.D. 600	57·19°
34 years	61·85°			34 years	96·45°
89 days	4·22°			89 days	142·59°
	371·56°				296·28°
Deduct	360°				
	11·56°				

	Mercury's M.L. minus sun's M.L.	Venus' M.L. minus sun's M.L.
11·56°	371·56°	296·23
	— 85·58° *v*	— 85·58 *v*
	285·98° *a*	210·65 *a*

(2)—*b*. Longitude of planet's apsis *minus* sun's mean longitude.

	Mercury		Venus	
Longitude of planet's apsis for A.D. 634 *	220·43°		(=79 81° + 360°) 439·81	
Deduct sun's mean longitude (as above) ...	— 85·58°		— 85·58	
	134·85°	*b*	354·23°	*b*
(3)—*v*. Mean longitude of sun	85·58°	*v*	85·58°	*v*
(4) Planet's annual equation for *a* (Table IV) ...	— 17·5°	(4)	— 44·5°	(4)
(5) Take half of (4) with reversed sign, and add to *b*	134·85 + 8 75°	...	354 23° + 22·25°	
	143 60	(5)	376·48°	(5)
(6) Planet's anomalistic equation for (5) (Table IV).	+ 2·7°	(6)	+ 0 55°	(6)
(7) Take half of (6), with reversed sign, and add to (5)	143 60 — 1·35°		16 48 — 0·27°	
	142·25°	(7)	16·21°	(7)
(8) Anomalistic equation of (7) (Table IV) ...	+ 2·8°	(8)	+ 0·55°	(8)
(9) Take (8), with reversed sign, and add to *a*...	285 98° —2·8°		210 65° — 0·55°	
	283·18°	(9)	210·10°	(9)
(10) Annual equation of (9) (Table IV)	— 18·0°	(10)	— 44·5°	(10)
(11) Add (8) and (10)	— 15·2°	(11)	— 44·0°	(11)
(12) Add *v* and (11)	70·38°	(12)	41·58°	(12)

70·38 or 10½ degrees in **Mithuna** is the true **geocentric place of Mercury** for the moment in question, while 41·58° or 11½ degrees in **Rishabha** was the true **geocentric place of Venus.**

N.B.—These geocentric places could have been ascertained, by mere inspection, either from the Eye-tables, or from Tables V-A and V-B, see paragraphs 276 and 322 below.

238. II. To find the *latitude* of Mercury (i.e., his distance above or below the ecliptic for the same moment)—

(13) Mercury's mean longitude	11·56° or 371·56°
minus longitude of Mercury's node (Table IV) ...	—20·74
	350·82° (13)
(14) Take (8) above, with sign reversed, and add to (13) :	—2·8°
	348·0° (14)
(15) Sine of (14) according to Table IV-H	630 (15)

(16) Equation corresponding to (9) supra, 283·18° by Table IV-G. Equation for 281·25° = 3886 ; while equation for the next stage 285·00 = 3957, difference between the two equations = 71

(Table IV-I) „ „ 1·92° = ·51 × 71 = 36·21

∴ Equation for 283·18° = 3886 *plus* 36 = 3922 — 3922 (16)

(17) Multiply (15) by 120, as a constant for Mercury, and divide the product by (16)

$$\frac{630 \times 120}{3922} = \frac{8560}{3922} = 2\cdot1$$

Now by Table IV-F, 225 is the sine of 3·75°

$$\therefore \quad 2\ 1 \text{ is the sine of } \frac{3\cdot75 \times 2\cdot1}{225} = \cdot031°$$

N.B.—The corresponding constants for the other planets are the sines of their greatest apparent latitudes, given at foot of Table IV-G.

The latitude of Mercury is ·031° and inasmuch as (14) is greater than 180°, i.e., below the ecliptic, the latitude ·031° is south.

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* The apses and nodes of planets, except the moon, have such slow motions that their places need not be calculated for odd years and days.

Mars, Jupiter and Saturn (superior planets).

239. I. *To find the geocentric longitude of Mars, Jupiter and Saturn (superior planets) for 89 completed days in solar year A.D. 634 (mean sunrise on 17th June A.D. 634, when there was a partial lunar eclipse) see paragraph 268, page 107 below.*

Time and English date. Mean Lankā sunrise on 17th June A.D. 634 (15th Śukla tithi of lunar Āshāḍha).

(1) A. Mean longitude of sun *minus* planet's mean longitude.

	Mars	Difference between mean longitudes of sun and Mars.	Jupiter	Difference between mean longitudes of sun and Jupiter.	Saturn	Difference between mean longitudes of sun and Saturn
Mean longitude of sun (85·58° by Table IV-C) + 360°		= 445·58°	Jupiter's	445·58°	Saturn's	445·58°
	Mean longitude of Mars		mean long.		mean long.	
For A.D. 600,	257·91°		11·63°		201·98°	
,, 34 years,	27·37°		311·81°		55·45°	
,, 89 days,	46·64°		7·39°		2·98°	
	331·92°	—331·92°	330·83°	—330·83°	260·41°	— 260·41°
		113·66° A		114·75° A		185·17° A

	Mars.	Jupiter.	Saturn.
(2) B. Longitude of planet's apsis *minus* mean longitude of planet.			
Longitude of planet's apsis 130·04° or	490·04°	171·27° + 360° or 531·27°	236·62° + 360° or 596·62°
Mean longitude of planet ..	—331·92°	— 330·83°	— 260·41°
	158·12° B	200·44° B	336·21° B
(3) N. Mean longitude of planet.	331·92° N	330·83° N	260·41° N
(4) Planet's annual equation for A*	+ 38·5° (4)	+ 11·1° (4)	— 0·6° (4)
(5) Take half of (4) with reversed sign, and add to B ...	158·12°	200·44°	336·21°
	— 19·25°	— 5·55°	+ 0·3°
	138·87° (5)	194·89° (5)	336·51° (5)
(6) Planet's anomalistic equation for (5) [Table IV] .	+ 7·7° (6)	— 1·4° (6)	— 3·1° (6)
(7) Take half of (6), with reversed sign, and add to (5) ...	138·87°	194·89°	336·51°
	— 3·85°	+ 0·7°	+ 1·65°
	135·02° (7)	195·59° (7)	338·06° (7)
(8) Anomalistic equation of (7)*	+ 8·2° (8)	— 1·4° (8)	— 2·9° (8)
(9) Take (8), with reversed sign, and add to A ...	113·66°	114·75°	185·17°
	— 8·2°	+ 1·4°	+ 2·9°
	105·46° (9)	115·15° (9)	188·07° (9)
(10) Annual equation of (9) [Table IV]	+ 37·0° (10)	+ 11·1° (10)	— 1·0° (10)
(11) Add (8) and (10): ...	+ 45·2° (11)	+ 9·7° (11)	- 3·9° (11)
(12) Add N and (11): ..	377·12° (12)	340·53° (12)	256·51° (12)
The true **geocentric longitude**	17° in Mesha,	$10\frac{1}{2}$° in Mina,	17° in Dhanus.

N.B.—These geocentric places could have been ascertained, by mere inspection either from the planetary Eye-tables, or from Tables V-A and V-B. See paragraphs 276 and 322 to 324 below.

240. II. To find the latitude of Mars, i.e., his distance above or below the ecliptic for the same moment—

(13) Mar's true geocentric longitude	17·12° or 376·12°
minus longitude of Mar's node for A.D. 900 (Table IV)	— 40·07°
	336·05° (13)
(14) Take (10) above for Mars, with sign reversed, and add to (13):	— 37·0°
	299·05° (14)
(15) Sine of (14) according to Table IV-H	2981 (15)
(16) Equation for (9) above, 105·16°, by Table IV-G	3573 (16)

(17) Multiply (15) by 90, as a constant for Mars, and divide by (16)

$$\frac{90 \times 2981}{3573} = \frac{268290}{3573} = 75·1$$

N.B.—The corresponding constants for the other planets are the sines of their greatest apparent latitudes, given at foot of Table IV-G

Now by Table IV-H the sine 75 belongs to an angle between 0° and 3·75°

225 is the sine of 3·75°

∴ 75 ,, 1·25°

∴ The **latitude** of Mars sought is 1·25° which is south since (14) is above 180°

* See Table IV under Mars, Jupiter and Saturn respectively

241. *To find the longitude and latitude of the moon for the above moment*—

We should first of all find the moon's true longitude which we may calculate either from the tithi direct, which being 15 tithis completed is 180°. Moon's longitude = (moon's *minus* sun's longitude) + sun's longitude = 180° + 85·58° + ·32 (☉'s equation by Table IV-A) = 265·90°.

Now to find the moon's latitude at the moment sought—

(1) Find the place of moon's node, i.e., Rāhu—

By Table IV-K place of Rahu for A.D. 600 is .. . { 196·57 or 556·75

By same table Rāhu's motion for 34 years, 298·18°

N.B.—Rāhu's mean motion for odd years and days should be subtracted from the mean place for century. 89 days 4·77

34 years and 89 days = 302·95 — 302·95

253·80° (1)

(2) Moon's true place *minus* place of her node ... . 265·90° — 253·80

12·10 (2)

(3) Sine of (2) by Table IV-H ... ... 71·9 (3)

(4) Multiply (3) by $\frac{270}{3438}$, as a constant for the moon: $\frac{719 \times 2\cdot70}{3438} = 5\cdot6$.

By Table IV-H, 225 is the sine of 3·75°

∴ 56 „ ·94°

Inasmuch as (2) is less than 180°, the **latitude** sought is 0·94° north.

242. The reader should note—

(*a*) that for Venus the procedure is the same as for Mercury:

(*b*) that for Jupiter and Saturn, the procedure is the same as for Mars;

(*c*) that for Mercury and Venus, the geocentric longitude has for its basis the sun's mean longitude and not that of the planet; whereas the geocentric places of Mars, Jupiter and Saturn are based on their respective mean longitudes;

(*d*) that we may always subtract a larger number of degrees from a smaller by adding 360° to the smaller number;

(*e*) that the apsis of any planet except the moon does not change materially in position during a century, and that therefore we need not calculate the change of apsis for odd years or odd days;

(*f*) that after calculating *a*, *b* and *v*, or A, B and N, respectively, the procedure is the same for all planets, whether inferior or superior;

(*g*) that the mean longitudes of planets for decimals of a day may be obtained from the longitude for odd days by prefixing decimals to the latter. Only we should remember that a mean revolution of Mercury is completed in 87 days and a mean revolution of Venus in 225 days, and the increase of Mercury's longitude for ·89 day is not 0·422°, but 3·6422°. Similarly, the increase of Venus' longitude for ·231 day is not ·01009, but ·37009°;

(*h*) that the latitudes of planets are not referred to in Indian usage except in what is known as a planetary fight in astrology;

(*i*) that the greatest apparent latitudes of the several planets and their corresponding Hindu sines are given at foot of Table IV-G.

SECTION II.—*Examination of planetary time-records called horoscopes.*

243. Side by side with calendar dates expressed in vara, tithi and nakshatra, there are to be found, scattered here and there in Indian literature, records of time, indicating the positions of one or more of the chief planets on particular days, whereby the modern investigator is enabled, even when no year, month, or date is expressed, to compute the probable time at which the records were composed, or to which they refer. But to assess at their real value these planetary records,

usually called horoscopes, one or two preliminary observations are necessary in the light of facts disclosed by modern historical research In the first place, although the Indian horoscope as well as the Indian panchanga is at present used largely, and used chiefly, for astrological purposes, this was not the case always. It is certain that the sun's and moon's motions have been observed in this country from very ancient, in fact from vedic, times for the legitimate purpose of measuring time, and there is little doubt that, like the Babylonians, the Hindus also looked upon planetary records or horoscopes originally in the same light. Even now the horoscope is essentially a record of time from which the astrologer deduces what appears to him to be the influence of the several planets at the moment envisaged by the horoscope.

244. Secondly, as between the Indian calendar and the Indian horoscope, the latter is comparatively a new-comer. Traces of astrological prediction in the Indian literature of the centuries B.C. are few and far between, and they seem to point specially to prediction by means of the sun's and moon's movements rather than by means of the motions of the planets properly so called When exactly the people of this country became acquainted with the names of the other planets (for the sun and moon are also planets in the Indian system) or began to observe their motions, is a moot point. On the one hand it seems *a priori* probable, from the intercourse of this country with the western nations from very ancient times, that Greek, if not Phœnician, Chaldean and Egyptian astronomy and astrology must have found their way into this country at a very early time. It seems difficult to suppose that Chaldean astrology in particular, which was practised in the Grecian and Roman States for some centuries before A.D. 1, did not find its way into India in the wake of Alexander's conquest or of the Græco-Bactrian civilization. Indeed in an account of the life of Apollonius of Tyana, who lived in the first century A.D., it is stated that he became acquainted with the names of the planets and of the week-days from an Indian prince whom he visited, but there is reason to believe that the extant semi-mythic accounts of the life of Apollonius of Tyana were composed considerably later than the first century A.D.

245. All the historical, as distinguished from the presumptive, evidence that has come down to us points to the probability of western influence on Indian planetary astronomy not having been anterior to the fourth or fifth century A.D., when the works of the great Greek astronomer and astrologer Klaudios Ptolemy and his successors, Paulus Alexandrinus and Firmicus Maternus, were first introduced into this country during the Gupta period. Some mention is made of planet names in the *purānas*, but the date of composition of the *purānas* is itself a matter of critical speculation. On the whole it may be safe to presume that the Hindus in some way became acquainted with the names of the planets, and possibly of the planetary week-days, a century or two before the Christian era, but that they did not make any practical use of this knowledge until they were brought face to face with its results in Ptolemy's works in the fourth or fifth century A.D. It seems also exceedingly probable that the practice of calculating horoscopes or the positions of the planets at given moments, came into vogue in India a century or two after the fifth A.D. Whether any particular part of the country, e.g., Southern India, acquired a knowledge of planetary astrology from independent Chaldean sources before the introduction of Ptolemy's works into Northern India is also a matter purely for conjecture. We have it on the authority of Juvenal, the Latin satirist of the time of Domitian (first century A.D.), that in his time the wealthy Roman ladies used to employ four classes of sooth-sayers, the Phrygian, the Chaldean, the Etruscan and the Indian. From the way in which Juvenal has coupled Indians with Phrygian augurs in this passage (Satire VI, lines 585—587) it may be presumed that Indian fortune tellers were imported into Rome for their knowledge of augury and not for their knowledge of astronomy, for which Juvenal seems rather to give credit (in this respect again the passage is not free from doubt) to the Chaldean, not to the Indian, sooth-sayer. In confirmation of Juvenal's statement, we have allusions to an Indian science of birds (in the sense of augury) occurring in literature which is entirely destitute of notions of planetary astrology, e.g., the Tamil *Tolkāppiam* The passage where Juvenal refers to Indian augury or Indian astrology has

been the subject of numerous *variæ lectiones* (various readings) and one version refers to female, not male, fortune tellers (*Indæ* = Indian women).

	Translation.
Divitibus responsa dabunt Phryx augur et Indus *Conductus, dabit astrorum mundique peritus,* *Aut aliquis senior qui publica fulgura condit.*	To the rich women answers will be given by a Phrygian augur or by an Indian engaged for hire, or by one who understands the universe and the stars, or by an elderly person who covers up with due rites the parts of the city which have been struck by lightning.

Note.—(1) For *dabunt* some editions read *dabit*
(2) For *Indus*, the various other readings are *Indæ*, and *inde*

246. The practical deduction from all these considerations is that one has to be very sure of one's ground before imputing to Indian society before the fifth century A.D. a knowledge or practice of planetary astrology (compare remarks in paragraph 50, page 15 *supra*). Such Indian horoscopes as refer to a previous period must have been composed retrospectively, and this remark applies in a special manner to Rāma's horoscope in the Rāmāyaṇa, which occurs in a canto admitted by critics to be a subsequent composition. Whether Rāma's horoscope was meant to be a real horoscope or merely a description of planets in certain exalted positions has also not yet been settled; but taking it as a horoscope, Bentley ascribed it to the year 961 B.C. while the present writer, had in previous works of his computed the time to correspond to 964 B.C. although he would now not attach any particular significance to the year 964 B.C. as a year of Rāma's birth, or even as a year answering the conditions of Rāma's horoscope (vide paragraph 302 *infra*). The exact manner in which this interesting horoscope can be computed will be shown in section iii of this chapter (pages 112 to 122 *infra*). The references to planet-positions in the Mahābhārata are so conflicting that it is impossible to make any inference from them as to the time referred to; whereas a genuine horoscope containing the positions of the principal planets in rāśis, provided the time of year is indicated even in general terms, should enable an investigator to verify a date in such a manner that the same horoscope would not be applicable to any other date during a period of several thousands of years This is the chronological vantage-ground of the horoscope, and it will be illustrated presently by a thoroughly practical, and at the same time a somewhat unique, example from early Tamil literature; but horoscopes are liable to all the failings to which human compositions are subject, and unless one was certain of all the elements in a horoscope having been correctly recorded, the time inference drawn therefrom may turn out to be widely discrepant from the truth. The obvious inaccuracies in the Mahābhārata references to planets will be commented on in an Appendix. (Paper No. v.)

247. Table V-A showing the increase of the mean longitudes of the principal planets, Mars, Jupiter and Saturn for a period of 2,000 years will be found useful in such investigations. It can be used in various ways, but the most practical way of using it will be illustrated by an example which has itself considerable interest for the student of Tamil literature. The ancient Tamil anthology called *Paripāḍal*, of which an excellent edition in print was brought out in 1918 by the veteran editor of Tamil classics, Mahāmahōpādyāya Paṇḍit V. Swāminātha Ayyar, and of which the date of composition is as yet a mystery, contains, in the eleventh canto, a description of the river Vaigai (near Madura) in flood. The author of this poem *Nallantuvanār*, commonly believed to be one of the *sangam* poets, to whom we also owe *Kalittogai*, says (see Text, English translation and commentary extracted below, page 109) that he witnessed the flood on a morning when the moon was eclipsed, when the nakshatra Krittikā (26·7° to 40° longitude) was at day-break "high up," i.e., at or near the zenith, when Mars was in Mēsha (0° to 29° longitude), Jupiter was in Mīna (330° to 359°), Saturn was in Dhanus and going towards Makara (say 260° to 269°), Venus in Rishabha (30° to 59°) and Mercury in Mithuna (60° to 89°).

248. This extract from the poem is a horoscope in the true sense of the word, for it is a time-record, though one drawn up on the occasion of the occurrence of a flood, not of the birth of a human child. It is just the kind of horos-

cope that one would expect from the Babylonian prototype. There are many circumstances which make the investigation of this mysterious time-record as difficult as it is interesting. In the first place, if the poem really is very ancient, the poet may have become acquainted only with the mean positions of the planets, and he may have supplemented his knowledge by observing their actual situation in the heavens. Secondly, the above positions are recorded in Tamil verse, whose quaint language cannot be understood even by Tamil readers without a reliable commentary. In this case the commentator, himself an ancient classical author, Parimēlalagar, whose commentary on Tiruvalluvar's Kural is well-known, enjoys the reputation of being thoroughly reliable in literary matters and he may be presumed to be no less so in astronomical matters. Thirdly, neither the lunar month nor the position of the sun is referred to directly in the passage, but from the circumstance that nakshatra Krittikā, whose sidereal longitude is between 26·7° and 40°, was in or near the zenith at daybreak, the commentator, *Parimēlalagar* infers that the sun must have been at or near 90° from this position, i.e., the sun's longitude must have been between 116·7° and 130° since he had not yet risen when the nakshatra was in the zenith. If so, the sun must have been in the first few degrees of Simha *rāśi*, and the time must have been within the first few days of the month of *Āvani* or *Simha*; this, in fact, is the commentator's own statement. There is a fourth circumstance which the commentator is careful to note as limiting the position of both sun and moon; for he remarks that as it was a time of lunar eclipse in Srāvana month, the moon must have been in nakshatra *Sravishthā* or *Dhanishthā* (293·3° to 306·7° according to Sūrya and Ārya siddhāntas; 294° 7′ 5″ to 307° 7′ 40″ according to Brahma siddhānta and Siddhānta Sirōmani, see Eye-table, section S); and as the *tithi* or distance from the moon to the sun at the middle of a lunar eclipse is exactly 180°, the sun's longitude could not have been less than 113·3° or more than 127° whichever of the four siddhāntas was followed; and he could not have been more than 7 days old in Simha *rāśi* or month. An astronomer may be disposed to object that the hypothesis of the sun being in Simha rāśi and the moon in Dhanishthā nakshatra hangs on a single peg, namely on Krittikā nakshatra being exactly at the zenith, but the ancient Tamil commentator Parimēlalagar appears to have entertained no doubt on the point. Fifthly, from the position of Mercury, and more especially from that of Venus recorded *by the poet*, 60° to 89°, and 30° to 59°, respectively, when the sun was, *according to the commentator*, between, say, 120° and 127°, it may be inferred (if the commentator is right) that the poet could not have recorded, or even contemplated, *actual* positions in respect of these planets. The possibility that he referred to *actual* positions in respect of Venus and Mercury as well as of Mars, Jupiter and Saturn, constitutes in fact the crux of the problem; and we shall examine this alternative later. It will be seen from the anomaly and equation tables of Mercury and Venus (Table IV of the present work) that their maximum distance from the sun is 26° and 48·03°, respectively (i.e., the sum of maximum equations for each planet in Table IV), whereas according to the poet's description, Venus was not less than 60° and Mercury not less than 30° from the sun. Thus, in the case of Venus, it is clear that if the sun was really in Simha, the poet could have had in view its *mean* longitude only; and if so, it becomes pertinent to ask whether he did not contemplate *mean* longitudes in the case of the other planets also. This is our sixth difficulty. [The difference between mean and actual longitudes in the case of Jupiter and Saturn is never very much, but Mars's actual position may be removed by as much as 51·6° from his mean position.]

249. Seventhly, and lastly, the poet may have recorded the positions of the planets either actually as he saw them in the heavens, or partly as he saw them and partly as he imagined them from his knowledge of astronomy. As we have just observed, however, he could not possibly have *seen* Venus in the position he has recorded, if the solar month was Simha or Āvani, as stated by his commentator.

250. Having noted all these seven difficulties, we shall endeavour to solve them, and Table V-A should enable us to do so if there is a solution. To use Table V-A properly, we want two temporary tables which we should make afresh for each problem, and which we shall call respectively "the table for a fixed year" and "the table of moveable years." We note first of all from Table IV the mean

positions of the planets in 1 B.C., i.e., 0 A.D. (which we treat as our fixed year) at a time when the mean longitude of the sun was about 125°, or when about 130 days of the Indian solar year had passed (Table IV-C). This is a good *average* time of the year for the occurrence of a lunar eclipse in Śrāvaṇa.

Table for fixed year 1 B.C. = 0 A.D.

Mean positions of planets at end of 130th day of the Indian solar year, 1 B.C., or 0 A.D.

——	Mars	Jupiter.	Saturn.
(1) At commencement of Indian solar year in B.C. 1=0 A D (Table IV)	254·74°	163·17°	70·54
(2) Planets' motion for 130 days (Table IV)	68·12°	10·80°	4·35°
(3) Total	322 86°	173 97°	74 89°
(4) or in nearest degree	323°	174°	75°
(5) Actual geocentric places recorded by the poet ...	0° to 29°	330° to 359°	270° to 299°
(6) Mean positions corresponding to actual positions recorded by the poet (according to planetary eye-table).	320° to 340°	320° to 348°	274° to 303°
(7) To (4) we have to add in order to arrive at (6) mean positions corresponding to those recorded by the poet ...	$-3°$ to $+17°$	146° to 184°	195° to 224°
(8) If the year we are in search of is B C., then we should in order to reach it, add algebraically to (4)	$-343°$ to $-3°$	$-180°$ to $-210°$	$-130°$ to $-160°$

251. We now see the use of Table V-A which will enable us to construct our second table, the one for moveable years, in other words to determine approximately, as a first step, the year or years A.D. or B.C. when alone the increases in longitude noted in the last two lines (7) and (8) supra were *possible*. Line (7) of the table will help us in A.D. years and line (8) in B.C. years.

252. Table V-A does not give the increases of longitude of Venus or Mercury from year to year, because their positions are difficult to follow except in the light of the sun's movements and if the others are right, a difference in the position of Venus and Mercury alone may not matter; on the other hand, if in the year that we fix upon, Venus and Mercury happen to be in the positions required by us, so much the better. The actual positions of both Mercury and Venus depend but to a small extent on their mean longitude and principally on the sun's.

253. It is usually therefore, enough, provided we know the month, to set to work with the three major planets, Mars, Jupiter and Saturn, particularly when we are in search of *actual* positions. We may repeat once more that the mean longitude neither of Venus nor of Mercury is a guide, except indirectly, to their actual position which is determined by the sun's position, coupled with the annual and anomalistic equations of Venus or of Mercury as the case may be. We shall find that the search for the positions of three planets is tedious enough when our object is not merely to find when the planets attained certain *mean* positions, but to locate them in their *actual* positions in a year satisfying all our conditions. In the case of Mars in particular we have to bear in mind that the difference between his actual and his mean position varies according to the time of the year. This fact is made evident by Mars's eye-table, which shows us that in order that Mars may be *actually* in Mesha (0° to 29°) on or about the 130th day of the year, his mean position should be between 320° and 340°, and the addition we have to make to the mean position of Mars on the 130th day of our fixed year (1 B.C.) in order to arrive at an actual position in Mēsha rāśi is $-3°$ to $+17°$ which we have accordingly entered in line (7) of the table in paragraph 250. In the case of Jupiter and Saturn we have taken the precaution to extract their mean positions also from their respective eye-tables, but the difference is not very much in their case.

254. We find from Table V-A that the only years out of 4,000 which can possibly satisfy most of the conditions of our search (i.e., those as to the moon being in Śrāvaṇa and as to the mean longitudes of the three planets, Mars, Jupiter and Saturn) entered in line (6) of the table in paragraph 250 are the following. This will be our table of moveable years from which we should be able to select one to suit our purpose finally. It is therefore of the utmost importance to include in

our table of moveable years in the first instance *all* possible years, so that even if we have to make another table for our fixed year, as we shall have to do in this case, we may not have to change our second table or table of moveable years.

255. *Table of moveable years with reference to 1 B.C. or 0 A.D., as a fixed year; 130th day of Indian solar year. Mean longitude in fixed year 1 B.C.* (*v.* line 4 of the table in paragraph 250).

323° (Mars) 174° (Jupiter) 75° (Saturn)

Limits of increase sought (*v.* lines, 7 and 8 of the table in paragraph 250), in other words, *quantities to be added to the mean longitudes of Mars, Jupiter and Saturn at full moon in Śrāvaṇa, 1 B.C., in order to arrive at the mean longitudes of the same planets at the end of the same tithi in the year sought.*

A.D. Years : − 3° to + 17° (Mars) + 150° to + 180° (Jupiter) 200° to 230° (Saturn).
B.C. Years : − 343° to − 3 (Mars) − 180° to − 210° (Jupiter) − 180° to − 160° (Saturn).

Years.	Day of solar year corresponding to Śrāvaṇa full moon.	Mars. (Table V-A).	Jupiter. (Table V-A).	Saturn (Table V-A).
A.D. years.				
A.D. 17 (lunar eclipse in Śrāvaṇa—see Table II)	134	14	156	208
A.D. 634 (lunar eclipse in Ashāḍha—Table II)	128	31	161	187
A.D. 694 (lunar eclipse in Āsvina—Table II)	114	355	181	200
A.D 871 (lunar eclipse in Bhādrapada—Table II, sun's longitude 157°)	185	34	153	203
A.D. 931 (no lunar eclipse)	131	358	173	216
A.D 1050 (lunar eclipse in Śrāvaṇa—Table II)	134	95	185	280
A.D. 1108 (lunar eclipse in Kārttika—Table II)	123	37	145	219
A.D. 1168 (lunar eclipse in Āśvina—Table II) ...	129	1	166	232
A.D. 1548 (lunar eclipse in Kārttika—Table II) .. .	115	15	178	195
B.C. years.				
A.D − 160, i.e., 161 B.C. (lunar eclipse in Śrāvana—Guinness* Tables)	..	− 25	− 176	− 155
A.D. − 220, i.e., B.C. 221 (no eclipse in Śrāvaṇa but there was a lunar eclipse in May 9, Rishabha solar month—Guinness' Tables)	...	− 349	196	− 168
A.D. − 397, i.e., B.C. 398 (no eclipse in Śrāvana, but there was a lunar eclipse in May 17, which would be the month of solar Mithuna or lunar Jyeshtha—Guinness' Tables)	..	− 28	− 168	− 171
A.D. − 1572, i.e., 1573 B.C. (no lunar eclipse) ...		− 289	− 186	128

256. The B.C. years will not yield us any date when there was a lunar eclipse in Śrāvana and when the three major planets were in the positions assigned to them by the poet. Although there was a lunar eclipse in Śrāvana of 161 B.C., the mean position of Mars was then such that the planet could not actually have been in Mēsha at full moon in Śravana of that year. The other B.C. years in our table of moveable years are not worth investigating, since there was no lunar eclipse in two of them, while in the third, the eclipse was in Jyeshthā, and Mars' mean position (323° — 28°, i.e., 295°) was not such as to give us an actual position for that planet in Mēsha.

257. Incidentally, we may note first that Table V-A is equally useful for a search up to 2000 B.C. or down to A.D. 2000, or for any period of 4,000 years in all. Secondly, in order to use Table V-A, it is not necessary that we should make a start always with mean longitudes of 1 B.C. We may start by calculating mean longitudes for any year B.C. or A.D. and, with that as a fixed year, proceed to determine, by addition or subtraction according to Table V-A, the mean longitudes attained on the corresponding day in any other year which we may call the moveable year. The mean longitudes of the three superior planets for every 10 completed days in the principal years from which, according to the nature of the problem, the choice of a fixed year will have to be made are given at the beginning of Table V-A. These years are 3201, 3102, 2101, 1101, 101, 1 B.C. and A.D. 1000 and 1800. The advantage of making a start with 1 B.C. or 0 A.D. is that each one of the moveable years in our field of selection (the second table) becomes *ipso facto* an A.D. year. This, however, is an advantage which we can easily forgo, provided there is any reason for choosing a fixed year other than 1 B.C. The method of subtraction for B.C. years has obvious inconveniences and it will

* "Tables of Vernal Equinoxes and New Moons for 3,555 years" By H. Grattan Guinness, D.D., F.R.A.S. (London—Hodder and Stoughton, 1896).

generally be better to use the method of addition even for B.C. years, as illustrated in section iii of this chapter, on Rāma's horoscope (paragraph 294, p. 118 below).

258. In A.D. years, if we apply the test of a lunar eclipse in Śrāvana month which, as is the case with eclipses always, ought to be a conclusive test, and *if the ancient commentator is right*, there is only one year which satisfies more or less the Paripādal horoscope, although some critics may demur a good deal to accepting it; and that is A.D. 17 in which the actual positions of Mars, Jupiter and Saturn were, as any one may, with a little trouble, satisfy himself by following the instructions in paragraphs 237 and 239 *supra*, or much more quickly by using tables V-A and V-B.

Mars 25·5° in Mesha.
Jupiter 334° or 4° in Mīna.
Saturn 274·1° or 4° in Makara.

Venus' *mean* longitude at the same date was 28° which was only 2° short of Rishabha; it has already been shown (paragraph 248) that Rishabha was an impossible rāśi for the actual position of Venus under the given conditions; in A.D. 17 on Śrāvana full moon day she was *actually* in 90·02° (end of Mithuna or beginning of Karkaṭaka). Mercury's mean longitude at Śrāvana full moon of 17 A.D. was not Mithuna, but 252·77° (Dhanus) and his actual position was 156·02° (Kanya).

259. Among the possible A.D. years which we selected with the help of Table V-A there is only one, other than A.D. 17, in which there was a lunar eclipse in Śrāvana month, and that is the year A.D. 1050; but in that year Mars' increase of mean longitude was +95° which would never give us an actual position for Mars in Mēsha (in fact it yields an actual position 92·57° i.e., 3 degrees in Karkaṭaka, the fourth rāśi instead of the first). Also, in A.D. 1050, neither Venus' mean, nor her actual position, was satisfactory. Therefore, apart from considerations of the probable period of the literary work *Paripādal*, A.D. 1050 must be rejected.

260. The fixation of A.D. 17, as a date for the poem, however satisfactory it might be to the upholders of the theories propounded by the late Mr. Kanagasabhai Pillai (in his *Tamils 1,800 years ago*) and by Mr. A. Kumāraswāmi (quoted by Dr. HULTZSCH in *South Indian Inscriptions*, volume II, Part iii, p. 378, 1895), namely, that the extant *Sangam* literature in Tamil was produced in the first century A.D., runs counter to all probabilities, as inferred in paragraph 245 supra, of the period when Indian astronomers could have begun to calculate the movements of the planets. There is a bare *possibility*, as the writer has already hinted, that the South-Indian astronomers received the elements of the planetary motions from a direct Chaldean source in the centuries immediately preceding the Christian era, but it has to be remembered that there is no *evidence* of their having habitually cast horoscopes before the seventh century A.D. If would appear that from Alexander's time at least the Śramaṇas (or Jains) boasted of an astronomical learning equal or superior to that of the Brahmanas, and possibly the Jain astronomy inculcated a knowledge of the planetary motions, and Jains were plentiful in Southern India from the fourth century B.C. There is also a good deal that has a look of great antiquity about it in the way in which the Tamil people have clung to the solar reckoning when all the rest of India practically followed the lunar reckoning, in the peculiar way in which they name some of the solar months when ordinarily all other month-names have been confessedly borrowed from Sanskrit, in the many variations of solar month-names, to be found among primitive tribes in Southern India, e.g., Tulu month names, noted by DR. BURNELL in his *South Indian Palæography*, and Toda month names on the Nilgiris, noted in DR. RIVERS' *Todas*; and lastly in the many synonyms which are to be found, in Tamil only, for the names of nakshatras. (See *Piṅgala Nigaṇḍu.*)

261. Still, before accepting A.D. 17, one would like to know something about the other evidence for the relative age of this poem *Paripādal*, as compared with other works of the *sangam* age. Most of the productions of that age which have come down to us have come down only as anthologies, and this is a class of literature peculiar to Tamil. Hundreds of poets are known to have flourished during the *sangam* age in each part of the Tamil country: of a very few of them

like Tiruvalluvar, Ilangō-Adigal, Sittalai Sāttanār, Tiruttakkatêvar (authors of the well-known *Kural*, *Silappadikāram*, *Manimēkalai*, and *Jīvaka Chintāmani*, respectively) we have entire works that have come down to us, as *sangam* works: all the rest are preserved either by name only or in ancient anthologies, called *Padirruppattu*, *Pura-nānūru*, *Aha-nānūru*, *Nāladi*, *Narrinai*, *Kuruntogai*, etc.; and we are left to conjecture the period during which these poets' works must have been current, each in its entirety, before *their* posterity thought it prudent to preserve them in anthologies or excerpts of their works; and such abridgements must have been necessitated by the rapidly accumulating bulk of literature and the difficulty and expense of making copies of entire works. The careful way, too, in which these anthologies were compiled, the number of genuinely good poets whose remains are, as it were, enshrined in them, and the scrupulous accuracy with which they were annotated by eminent commentators, some of them men not less famous than the authors whom they annotated, must make us pause before we can limit the *sangam* period, (even supposing it came to an end about A.D. 800), to less than three or four hundred years before that date; that is, nobody would have taken the trouble that has been taken with these anthologies or in editing so systematically such minute extracts unless the poets' names were really ancient and nearly as venerable then as they are now. In the allegorical language of the legend associated with the origin of *Nāladi*, the *sangam* editors were so fastidious in their choice that they salvaged only those productions which had resisted the devastating flood of time. See further Paper No. (iii) in Appendix "on the chronology of early Tamil Literature."

262. About *Paripādal* itself, its venerable editor in print tells us in his preface that he was able to secure only two manuscripts (which were copies, the one transcribed from the other) containing the extant portions of the anthology (20 out of 70 ancient selections), and certain other manuscripts containing a few fragments: and it is scarcely likely that any portion of this work, not already published by Mr. Swāminātha Ayyar, will ever come to light hereafter and help us to unravel the age of its composition, or, supposing that it really belonged to the first century A.D., to enlighten us as to how the poet acquired his knowledge of planetary astronomy. Even so, other portions of the Paripādal anthology which deal with developments of Śaivism and Vaishnavism seem to be more recent than the first century A.D., if we are to follow Dr. Bhandarkar and other eminent authorities.

263. We have so far given full credit to the ancient commentator Parimēlalagar for correctly interpreting the poet, but we have done so at the expense, so to say, of the positions of the inferior planets, to one of which only (viz., Venus) the commentator's hypothesis of sun in Simha and a lunar eclipse in Śrāvana month allows even an approximately correct mean position, while Mercury's position, whether mean or actual, has to be abandoned altogether on that hypothesis. Also, the time of lunar eclipse in Śrāvana month in A.D. 17 was not the morning but, as any one may satisfy himself by computing the sun's and moon's anomalies and equations, at ·55 of the day (i.e., an hour after sunset) on the 27th July A.D. 17. This is the first feature that strikes us as defective in the commentator's hypothesis; for the poet says that, when Krittikā nakshatra was at or near the zenith at daybreak on a certain day, "presently" (the poet is careful to use the expressive Tamil adverb *ollai*, i.e., "presently"), there was an eclipse of the moon. The poet would not have referred in these terms to an eclipse which had occurred the previous evening or which was to occur in the evening of the day when Krittikā was near the zenith in the morning.

264. We are reluctantly led to the conclusion that the commentator was, like ourselves, trying to make the best of an obscure text, but that not having at hand the astronomical tables that we have, he hazarded his hypothesis about the lunar eclipse having occurred in the month of Āvani or Simha, when the moon was in nakshatra Dhanishṭhā or Śravishṭhā, simply because Krittikā nakshatra was thought by him to be then at or near the zenith, and also fell into the error of supposing that a position of the sun in Simha rāśi was compatible with Mercury being actually in Mithuna or with Venus being actually in Rishabha.

265. It is somewhat dangerous, even in a purely astronomical speculation, to reject the authority of a commentator like Parimēlalagar, but the astronomical

critic cannot discharge his duty unless he exhausts every reasonable alternative that presents itself; and after all, it seems to be more than doubtful whether Parimēlalagar was the real author of the commentary on *Paripādal* which passes under his venerable name.

266. A lunar eclipse in Āshāḍha month, with the sun about 90° in mean longitude, is no doubt more compatible with actual positions for Venus and Mercury in Ṛishabha (30° to 59°) and Mithuna (60° to 89°) respectively, and we have a year among the A.D. years in our table of moveable years in paragraph 255, when there was a lunar eclipse in Āshāḍha, and that is the year 634 A.D. This eclipse occurred on 17th June 634 A.D., and the exact time of its occurrence, according to the Ārya siddhānta, as will be seen from one of the specimen problems worked out under the Ārya siddhānta Eye-table (p. 159) was 4,42½ a.m. The centre of the eclipse, according to Sūrya siddhānta was the moment of sunrise. (The reader should be able to verify this from Table II and Sūrya siddhānta Eye-table **e**, **h** and **y**.) It looks as if we had got hold of the very kind of lunar eclipse (*grastāsthamana*, i.e., the setting of the moon in a state of eclipse, see paragraph 29) that the poet says he actually beheld. It is true that in making a bid for this eclipse, we are setting aside the *commentator's* hypothesis, that because *Krittikā* (30°) was in the zenith at day-break, the sun must have been in or about 120° sidereal longitude. But the *poet's* description of Krittikā may mean " at or near the zenith" and it is just as reasonable to suppose that a Tamil poet using the word *uyar* (உயர்) in this context may have employed it to mean " high up" as that he meant " at the zenith." The eclipse was a partial one of 1½ digits and occurred, according to *L'Art de Vérifier les Dates* (the standard French work quoted in paragraph 134 supra) at 11-30 p.m. in the Paris meridian, i.e., about 4½ a.m. next day in the meridian of Madura. At this time the moon was eclipsed for an hour (see paragraph 135). The point of the ecliptic rising at that hour must have been that which rose two hours before the sun, i.e., the 59th degree of the celestial longitude. Krittikā nakshatra whose initial longitude is from 20° to 26° (according to the siddhānta followed) must have been at this time (4 a.m.) at least about one-third way up the heavens. By sunrise Krittika would have advanced to a point in the heavens about 30° from the zenith to the east. At 4-30 a.m. the darkness of the eclipse, though it was partial, would be such as to allow stars to be distinguished, notwithstanding the full moon, and Krittikā would still be fairly high up; and 4-30 or 5 a.m. is apparently the time indicated by the poet's expression *pular vidiyal*, i.e., at the first dawn.

267. If we search for a suitable year with a lunar eclipse in Āshāḍha month and with Mars, Jupiter and Saturn in the positions recorded by the poet, we shall want a preliminary table somewhat different from the one in paragraph 250 with which we started. Our starting points for 1 B.C. will then be as follows:—

—	Mars.	Jupiter.	Saturn.
(1) Commencement of Indian solar year in 1 B.C., A.D. 0	254 74	168·17°	70 54°
(2) Planets' motion for 89 days	46·64°	7·39°	2·98°
(3) Total ...	301 38°	170 56°	73·52°
(4) or in nearest degree	302°	171°	74°
(5) Positions recorded by the poet	0° to 29°	330° to 359°	270° to 299°
(6) Mean positions corresponding to those recorded *by the poet* (by Planetary eye-tables) .	314° to 347	320° to 350°	274° to 303°
(7) Number of degrees to be added in each case to (4) in order to arrive at (6)	12° to 45°	150 to 180°	200° to 230°

For Mars we shall now want an increase of longitude (over and above his 1 B.C. longitude) of 12° to 45°, for Jupiter 150° to 180°, and for Saturn 200° to 230°. We see that these limits are not such as to modify our second table or table of moveable years, on page 103, that is to say, the years included by us in that table will serve us as the possible years in this case also. And there is only one year among the A.D. years included by us in the table on page 103 which had a lunar eclipse in Āshāḍha. The possible year 398 B.C. when the sun was in Ṛishabha has to be rejected, because Mars, at the eclipse of that year was, as already stated

(paragraph 256) not in Mēsha. (If Bhādrapada or Jyeshtha were suitable months for the lunar eclipse and for the sun's position, we would have to change our starting table again, but we know—paragraphs 248 and 256—that the month of Bhādrapada would be too late for the recorded positions of Mercury and Venus and in Jyeshtha the sun would be too near Krittikā nakshatra. Moreover our second table would not be different for Jyēshtha, for which the limits of increase of longitude for Mars would be — 9° to + 30°, limits already included in our table of moveable years, and in that table there is no lunar eclipse in Jyeshtha.)

268. The mean longitudes of the five planets at mean sunrise (6 a.m.) on 17th June A.D. 634 (full moon tithi of lunar Āshādha month when the moon was in a state of eclipse), were as follows:—

—	Mars	Jupiter	Saturn	Venus	Mercury
Mean longitudes .	351·92°	330·83°	262·41	296·28°	371·56

and the actual positions, whether we follow the instructions in paragraphs 237 and 239 supra, or the much simpler processes by the Eye-tables, or by Tables V-A and V-B, fully illustrated in the next two sections of this chapter (pp. 112 and 133) were—

actual geocentric places	16·12	339·53°	256·51	41·53	70·38°
and the Rāsis . .	Mesha	Mina	i.e., second-half of Dhanus, 13° short of Makara.	Rishabha	Mithuna

This seems far more satisfactory than the uncertainties in which we were landed by our first attempt to follow the ancient commentator's hypothesis at all costs. All the planets are now in the actual positions recorded by the poet and we have not lost even one, not even Mercury, though we made no special endeavour to search either for that planet or for Venus. It is true that our result for Saturn is 13° short of Makara but that in all probability is what the poet himself means. His verse (see page 109 below) may be translated: "Saturn was at the end of *vil* (i.e., Dhanus) and was going to Makara," which makes much better sense of the text than the commentator's gloss: "Saturn was in the rāśi following Dhanus, i.e., in Makara." Moreover, as happily pointed out to the author by Mr. Manikka Nayagar, Tamil *virkadai* might mean what the commentator says, but Tamil *villirkadai*, the expression actually used by the poet, can only mean "*at the end of vil*, i.e., of *Dhanus*" not "after Dhanus." The commentator is, however, right in noting that the poet evidently views with satisfaction the fact that each of the planets Mars, Jupiter, Saturn, Venus and Mercury was either in his own house (svakshetra) or, (in the case of Saturn) going to it. In astrology, Mars permanently owns, or is lord of, Mēsha, Jupiter is lord of Mīna, Saturn of Makara, Venus of Rishabha, and Mercury of Mithuna. A planet like Saturn going to his own house is said to be very powerful, even though he may not be actually in it. We have also to note (see paragraph 297 below) that according to the Sūrya siddhānta, Saturn's place in 101 B.C. was 6° in advance of the place assigned to him in this work, and in A.D. 900, the planet occupied nearly the same place as he would by this work. In A.D. 600 his place by Sūrya siddhānta must have been at least 2·4° in advance of what is deducible from the present work. We say "at least" 2·4°, because subsequently a bīja was admitted in the case of Saturn which, if it had been accepted or adopted in A.D. 634, would have had the effect of advancing by several degrees the position of Saturn, just what we want in order to satisfy the commentator; but we must at the same time remark, that the bīja was in all probability adopted after A.D. 900 when the position of Saturn by Sūrya siddhānta began to fall behind his actual position in the heavens (see Table in paragraph 297, page 121 below, and also Burgess' *Sūrya siddhānta*, page 165, and Bentley's *History*, page 126). We may take it that Saturn's mean place by Sūrya siddhānta was about 260° or 10° short of Makara. What tables were used in India in 634 A.D. for ascertaining Saturn's actual place we do not know. On the particular morning in question, Saturn was above the horizon when the sun

was rising (sun being in 86th degree and Saturn in 256th of longitude). About 5 a.m., Saturn may have been just above the horizon or just below it; but the poet evidently was able to calculate where Saturn was at the time, whether or not he saw it in the heavens during the eclipse.

269. The poet does not say that the sun was in Siṁha; which he would surely not have omitted to note if that had been the case, because Siṁha is the sun's own house and the poet evidently noticed the fact that the five planets Mars, Jupiter, Saturn, Venus and Mercury were each in (or going to) his own house. The moon's own house is Karkaṭaka or Cancer, and the moon just then was in Dhanus (2̇:6° mean longitude).

270. On the whole, we need have no doubt now but that the poet was writing about the lunar eclipse which happened at or a little before sunrise on 17th June A.D. 634; and if our solution is at all near the mark, it furnishes us with a very reliable landmark in the history of Tamil *Sangam* literature, a landmark which, incidentally, is in perfect accord with another which was brought to light by the author some years ago, viz., the date A.D. 756 to be inferred from *Śilappadikāram*.* If Tables V-A and V-B had rendered to chronology no other service than to enable us to solve this one chronological riddle, they would be worth all the trouble expended on their compilation. Table V-A is most useful when we know for certain the solar or the lunar month of a horoscope; but it is equally useful when we have to guess the month in the first instance; for the positions of Mercury and Venus will then enable us to make a rough guess of the month, and for Mars we need only a table of moveable years with fairly wide limits of increase of longitude, like the one we actually framed with the help of the Mars Eye-table. The limits of Jupiter and Saturn do not vary very much, as we may see from their Eye-tables, for one month or for another. It is well to note thus the different ways in which our tables of fixed and moveable years should be adjusted to suit the mean and actual movements of the different planets.

271. The author has already taken the opportunity, in paragraphs 216 to 219, to warn the reader that in fixing the mean sidereal periods of planetary revolutions adopted in this work, he has followed, so to speak, no particular siddhānta but a siddhānta of his own. The reasons for this unusual procedure on his part are (1) that no two siddhāntas agree in this important matter, (2) that *bījas* are freely admitted for planets in the Indian siddhāntas, and one can never be certain in epigraphical research whether a particular record did or did not make allowance for *bīja*, (3) that one never knows which siddhānta to follow, (4) that where there is an antecedent probability, as in the case of the visible planets, that the person who framed a record did so after checking his calculations by ocular observation of the planets themselves in the heavens, more weight should be attached to the actual position of the planets, as a guide in fixing the time of the record, than to the particular siddhānta which may have been followed or to the particular *bīja* which was or was not allowed for. Experience, and the unsolicited testimony of numerous correspondents, particularly of Mr. Ketakar, the well-known author of "*Jyōtir-Ganita*" has shown that the present author in employing his own planetary siddhānta in Table V-B, has hit off, very accurately, for purposes of historical research, the actual positions of all the five planets. In the particular case expounded in this section, the place assigned to Saturn agrees very well with that which would follow from Professor Jacobi's Tables published in *Ep. Ind.*, Vol. XII (1912). The mean place of Saturn on the day in question was, according to Professor Jacobi, 294° + 322°, 37' + 5°, 33' or 262°, 10' whereas the mean place found above and fully worked out in paragraph 239 supra is 260°, 24', 6". (It has already been shown in paragraph 268 that according to Sūrya siddhānta, without *bīja*, which Professor Jacobi follows, Saturn's place in A.D. 634 must have been 2° in advance of that arrived at by means of this work.) The actual place, according to Professor Jacobi, must be equally close to the actual place arrived at above, because his tables, like those in Table IV of this work, are taken from Warren, who adopted them from *Vāvilāla Kuchinna*, a Telugu astronomer of the twelfth or thirteenth century A.D.

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* See paper iii in the Appendix, "Notes on the Chronology of Early Tamil Literature."

Paripāḍal, canto 11, *lines* 4—10.

(Edition of 1918 by Mahāmahōpādhyāya V. Swāminātha Ayyar.)

The Tamil Text.

Urugeḻu veḷḷi vandēṟṟiyal sēra	உருகெழு வெள்ளிவந் தேற்றியல்சேர
varuḍayyay ppaḍimakan vāyppa pporuḍeri	வருடையைப் படிமகன் வாய்ப்பப் பொருடெரி
pundi mitunam porunda ppularviḍiya	புந்தி மிதுனம் பொருந்தப் புலர்விடிய
lanki[1] yuyarniṟpa vandaṇaṉ pankuvi	லங்கி யுயர்நிற்ப வந்தணன் பங்குவி
ṉillattuṇaikkuppā leyda viṟayamaṉ	னில்லத் துணைக்குப்பா லெய்த விறையமன்
villiṟ kaḍaimakara[2] mēvappām pollai	வில்லிற் கடைமகர மேவப்பாம் பொல்லை
madiya maṟaya[3] varunaḷil.	மதிய மறைய வருநாளில்.

English translation.

"On a day when bright Venus joined with the Bull, when Mars obtained the Ram, when wise Mercury joined with Mithuna, at the first dawn, when Krittika stood high[1] up, when Jupiter was beyond the two houses of Saturn, and when Saturn was at the end of Dhanus and going to Makara, and Rāhu[3] was fast causing an eclipse of the moon . . . "

Parimelaḻagar's Commentary.

[1] "The poet says that Krittika was on high at daybreak in order to indicate that the sun was in Siṁha.

[2] "i.e., when Saturn, the brother of Yama, had reached Makara which comes after Dhanus.

[3] "The meaning of pāmpollai . . . varunāḷ is that it was Śravishṭha nakshatra on the full-moon day of the month of Āvaṇi. Therefore, it is evident that the moon and Rāhu were in Makara, and Kētu in the seventh house from Makara, i.e., in Karkaṭaka."

"The sense of the passage is 'at an eclipse of the moon on a day of nakshatra Śravishṭha in the month of Āvaṇi, when the planets were in the rāśis which are their own houses.'"

SECTION III.—*Perpetual Planetary Almanac.—Ascertainment of the actual place of a planet (Mars, Jupiter, Saturn, Venus or Mercury) on any day in any year between* 3102 *B.C. and A.D.* 2000.—*Rama's and Sankara's horoscopes.*

272. The reader who has followed attentively the observations made in the last section will have noticed (1) that it is a comparatively easy matter, with the help of Table V-A, to ascertain the year or years in which the planets Mars, Jupiter and Saturn attained any specified mean longitudes, but (2) that it is by no means easy to arrive at the actual places of these planets on the dates that we wish to examine, if our method of computation is to be that prescribed in paragraphs 237 and 239; and (3) that the ascertainment of the *mean* longitudes of Mercury and Venus in any year does not give even a rough indication of their *actual* places which depend mainly on the sun's longitude and to a very minor extent on the mean longitudes of the planets themselves. Much of our difficulty would disappear, if having been given a particular *mean* longitude for a planet, we could ascertain at once, without going through the 12 steps described in paragraphs 237 and 239 *supra*, the *actual* place of the planet. It is proposed to show in this section how the task of the investigator in this respect can be simplified without any risk to the accuracy of the result.

273. The most useful device in astronomy for calculating the moments of occurrence of phenomena in times long past is by means of cycles of recurrence. It will be shown in an appendix that the body of the present ephemeris was constructed upon a basis of cycles of recurrence in respect of the ending moments of tithis and nakshatras and their equations. In the same way we can make use of certain cycles of recurrence in the case of planets also. The principal cycles of recurrence for planets are noted at the beginning of Table V-A and the reader will do well to study carefully the effect of each cycle which will be explained presently. We learn from the *Encycl. Brit.* (11th Edition) art. *Astronomy, History*

of —, that the Babylonians of the second century B.C. used some of the very cycles of which we are about to learn the use, viz., 79 years for Mars, 46 years for Mercury, 83 years for Jupiter, 8 years for Venus and 59 years for Saturn.

But we want longer cycles than these if we wish to extend our calculations over long periods of time without sacrifice of accuracy. The most useful cycles for our purposes are accordingly the following, to most of which the reader has already been introduced in paragraph 222:—

(1)	For Mars, 363 years; increase of mean longitude	.	+ 0·107944°
(2)	For Jupiter,* 605 years; increase of mean longitude	...	+ 0·19714°
(3)	For Saturn, 383 years; decrease of mean longitude	...	− 0·091536°
(4)	For Venus,* 235 years; decrease of mean longitude	...	− 0·3897°
(5)	For Mercury, 355 years; decrease of mean longitude	..	− 0·091505°

There are other cycles which are tabulated at the beginning of Table V-A, but the above are so important that an investigator should be able to recall them and the corresponding increases or decreases of longitude from memory to at least two decimal places.

The meaning of the above cycles of recurrence is this: After 363 years from any given date, reckoned by the solar day of any Indian year, say the 10th solar day, the 100th solar day, the 125th solar day, etc., of Indian solar year 1 B.C. or A.D. 0, the planet Mars returns to the same mean longitude as at the beginning of the period of 363 years, increased by ·11°. Now the actual position of Mars is determined by a certain algebraical addition to his mean longitude, which addition in turn depends upon the difference between the mean longitudes of the sun and Mars on that date and the difference between Mars' apsis and Mars' mean longitude. On any given solar day, say, the 10th, the 20th, the 200th, or the 325th day of the Indian solar year, etc., the sun's longitude is always the same from year to year, the very slight variations noticed in paragraph 189 supra being negligible for our present purpose; and the longitude of the apses of all our five planets do not vary from year to year as will be seen from Table IV. Consequently, when Mars' mean longitude on any solar day of the year is the same or practically the same as on the same solar day at the beginning of our 363-year period, it follows that his actual place must also be the same as at the beginning of that period. The same observations apply to Jupiter after 605 years, to Saturn after 383 years, to Venus after 235 years and to Mercury after 355 years, making allowance for the fact that the actual places of Venus and Mercury follow closely those of the sun. Since the increase or decrease of longitude after each of these cycles of recurrence is less than half a degree, it follows that even after four cycles of recurrence, which in the case of the shortest cycle, that of Venus, is equal to 1,040 years, the difference in mean longitude is still negligible for our purpose; indeed, in the case of Jupiter, Saturn and Mars, which are the most important planets, we may repeat the cycles of recurrence up to 2,000 years without any sensible difference in the actual place of any of these planets; and in the case of Venus there is an important cycle of 948 years (noticed in paragraph 222 supra) which makes it possible to construct out of our cycle of 235 years a table of geocentric places for Venus for 10,000 years without any appreciable risk of error.

274. If, therefore, we could calculate the actual places of planets for 235 years in the case of Venus, for 355 years in the case of Mercury, for 363 years in the case of Mars, for 383 years in the case of Saturn and for 605 years in the case of Jupiter, we should have the means at our disposal for ascertaining the actual places of these planets on any day in any year for a period of 2,000 or any number of 1,000 years forwards or backwards. Table V-B gives the actual places of these planets for every 10 days, for 235 years in the case of Venus, for 363 years in the case of Mars, for 344 years in the case of Jupiter, for 383 years in the case of Saturn and for 355 years in the case of Mercury. In the case of Jupiter alone, the cycle fully calculated in Table V-B, and used in Table V-A, is shorter than the cycle of 605 years first mentioned, but the shorter Jupiter's cycle of 344 years, combined with a still shorter cycle of 261 years, is capable of yielding results fully equal in accuracy to those obtainable with the major cycle of 605

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* Jupiter's cycle of 1554 years and Venus' cycle of 948 years were used in paragraph 222 *supra* in preference to the shorter cycles of 605 and 235 years here mentioned.

years. After 344 years, Jupiter's mean longitude is changed by — 0·46832° ; after 261 years more his mean longitude increases by + 0·69111°, so that at the end of 344 + 261 or 605 years, his mean longitude increases by 0·69111° — 0·46832° = + ·2227°, the figure given above. It would of course be more satisfactory if we could have tables of actual places calculated to the longest periods of recurrence in the case of all the planets, but two considerations prevented the author from attempting such a gigantic task. The first was that the calculation of tables of actual places is a tedious process and is recognized as such by astronomers in the west as well as in the east. For the Indian Chronology (1911), and the first instalment of "Indian Ephemeris, A.D. 1800 to A.D. 2000" (published in 1915), the author calculated the actual places of planets for every 10 days in the year from A.D. 1840 to 1999—2000 A.D., in all about 160 years. These places have now been extended, as will be seen from Table V-B, to 235 years (Venus), 344 years (Jupiter), 383 years (Saturn), 363 years (Mars) and 355 years (Mercury). The second consideration was that so little use is likely to be made of these lists of actual places for the purpose of *historical* investigation, that it did not seem worth while to expend the additional time and trouble that would be necessary for constructing tables for cycles of recurrence longer than the above, when no corresponding improvement in the accuracy of results was in prospect. The single example of a useful planetary investigation in Tamil literature, commented on in section (ii) of this chapter, encouraged the author to expand his original table for 160 years into the present Table V-B, which is practically a perpetual planetary almanac, and which ought to answer the needs of the most fastidious investigator.

275. In order to use Table V-B for historical investigation, it is necessary to take from it the geocentric places of the planets for a particular day and apply them to any year past or future according to the key furnished in columns 5—9 and 11—15 of Table V-A. Column 1 of Table V-A gives the list of years from A.D. 1 to A.D. 2000, while column 10 of the same table gives the list of B.C. years from 1 B.C. to 1024 B.C. The reader will please note that columns 2, 3, 4 of Table V-A give the increase or decrease of mean longitudes of the three principal planets Mars, Jupiter and Saturn for any number of years reckoned forwards or backwards from a fixed year. The further use to be made of these columns in historical investigations has been fully explained in section ii of this chapter, paragraph 251, etc. The reader is, therefore, now concerned only with column 1 and columns 5 to 15 of Table V-A. An illustration will best show how these columns are to be used in conjunction with Table V-B. The first line of Table V-A reads as follows (omitting columns 2, 3 and 4, the use of which has been fully explained in section ii of this chapter).

Table V-A.

Col. 1	Col. 5 Mars.	Col. 6 Mercury.	Col. 7 Jupiter.	Col. 8 Venus.	Col. 9 Saturn.	Col. 10 B.C.	Col. 11 Mars.	Col. 12 Mercury.	Col. 13 Jupiter.	Col. 14 Venus.	Col. 15 Saturn.
A.D. 1	1816	1776	1816	1897	1916	1	1815	1775	1815	1896	1915.

This means that if we wish to know the actual position of Mars, say, on the 200th day of the Indian solar year in A.D. 1, it was the same (with a small cyclic variation) as Mars' actual place on the 200th day of A.D. 1816 (Table V-B); Mercury's actual place on the 200th day of A.D. 1 was the same as his actual place on the 200th day of A.D. 1776 (Table V-B) ; Jupiter's actual place on the 200th day of A.D. 1 was the same as his actual place on the 200th day of A.D. 1816 (Table V-B.); while Venus and Saturn, on the 200th day of A.D. 1, stood exactly where they stood, according to Table V-B on the 200th day of A.D. 1897 and A.D. 1916, respectively.

Similarly the actual places of the five planets on the 100th day of 1 B.C. were the same as their actual places on the 100th day of A.D. 1815, of A.D. 1775, of A.D. 1815 of A.D. 1896 and of A.D. 1915, respectively.

These places can be verified by actual calculation and they will be found to be the same as those given by the key in Table V-A, the cyclic variation in no case exceeding a degree. In the case of Mars, Jupiter and Saturn the exact variation is found as follows from the interval between the given year and the year which corresponds to it in the current cycle.

(Mars) The interval between A.D. 1 and A.D. 1816 is 1,815 years = 5 × 363 years.

The cyclic variation in Mars' place for 5 cycles of 363 years each = 5× (+·107 degree)= + ·535 degree or 32′.

(Jupiter) The interval between A.D. 1 and A.D. 1775 = 1554 + 261 years. The cyclic variation in Jupiter's place for this interval = —·09+·68 = +·59 degree or 36′.

N.B.—1554 years is a major cycle of Jupiter, vide paragraph 222 supra.

(Mercury) The interval between A.D. 1 and A.D. 1776 = 1,775 years = 5× 355 years.

The cyclic variation in Mercury's *mean* place for this interval is 5×(+·09) = +·45°, but since Mercury's *actual* place depends mainly on the sun's place and to a comparatively minor extent on his own mean place, it will be found by calculation that Mercury's place in A.D. 1 did not differ by even ·45 of a degree from his place on the same solar day in A.D. 1776.

The same remark applies to Venus, in whose case the interval between A.D. 1 and A.D. 1897 = 1,896 years = a major cycle of 1,661 years + a cycle of 235 years.

(Saturn) The interval between A.D. and A.D. 1916 is 1,915 years = 5×383 years. The cyclic variation in Saturn's place corresponding to this interval is only 5 × (— ·08) = — ·40 degree or only 24 minutes.

276. An actual example from a case with which the reader is already familiar will show not only the practical use of Table V-A in historical investigations but also the degree of accuracy—a very important point—which we may expect to attain by its means. Supposing we take the mean positions of the planets for any one of the years in the table of moveable years in paragraph 254 supra and wish to know the actual places of the planets on that particular date, taking first the year A.D. 634 which we found was a probable year, the actual longitudes (called geocentric places) of the planets at the completion of 89 days of the solar year in the year A.D. 634 were as follows :—

Places of planets on 89th complete solar day, A.D. 634.

[For the method of obtaining from the column " 90 days " in Table V-B the places of the planets on 89th complete day, see N.B. to paragraph 285 below] .—

				Table V-B.	Actual place ascertained by calculation, paragraph 287 or 289.
Table V-A.	Mars	A.D. " 1723 " —·3 = 17·8 —·3	=	17·5°	17·12
„	Mercury	A.D. " 1699 "	=	70·4°	7·04
„	Jupiter	A D. " 1844 " —·4	=	340·5°	340·5
„	Venus	A.D. " 1817 "	=	42·3	41·6
„	Saturn	A.D. " 1783 " +·3	=	256·4°	256·4

The A.D. years entered above are the years in the current cycle (Table V-B) in which the several planets attained the same places as they did in A.D. 634. The decimal places, — ·3, — ·4 and + ·3 are the cyclic variations.

It will be seen by comparison with the results of actual computation in paragraphs 237 and 239 that practically correct results can be obtained as above by mere inspection of Tables V-A and V-B. In the same manner we can obtain the actual places of the five planets for any of the other years tabled in paragraph 255 supra and satisfy ourselves that the year A.D. 634 is the only suitable date.

277. We may consider another example, that of Rāma's horoscope, along with which we may treat Śankara's horoscope as given in Mādhavachārya's *Śankaravijayam.* We are told, in Vālmīki's Rāmāyana, that Rāma was born " in the twelfth month Chaitra (this is the southern version), on the ninth tithi, on a day of nakshatra Punarvasū, when five planets were in their houses of exaltation, and when Jupiter was in Karkaṭaka, as lagna, along with the moon " Mr. M. N. Dutt's translation of the Rāmāyana, which presumably follows some northern version, has : " and then, when the six seasons had rolled away after the completion of the sacrifice, in the twelfth month, on the ninth lunar day, under the influence of the Punarvasū asterism, when the sun, the moon, Saturn, Jupiter and Venus

were at Aries, Capricorn, Libra, Cancer and Pisces, and when Jupiter had arisen with the moon at Cancer, Kauçalyā gave birth to the Lord of the Universe."

278. We may follow the southern version as being self-consistent, while Mr. M. N. Dutt's version places the moon simultaneously in its house of exaltation (Rishabha) and in the lagna (Karkaṭaka) which is impossible. The first *Moon* in Mr. M. N. Dutt's version is probably a printer's error for *Mars*, because *Capricorn* or *Makara* is Mars' house of exaltation, not the moon's. The reader unacquainted with astrology may have to be told that a planet's own house (vide paragraph 268 supra) is different from the house of exaltation now in question.

279. We may take it then, that the five planets in exaltation in Rama's horoscope were, --the sun in Mēsha (0° to 29°), the moon in Rishabha (30° to 59°), Mars in Makara (270° to 299°), Jupiter in Karkaṭaka (90° to 119°), and Saturn in Tula (180° to 209°).

280. We note that the month, solar or lunar, in which Rāma was born is described as the twelfth month. Chaitra month is mentioned in the southern version, and Chaitra can be described as the twelfth month only with reference to the solar year, since it is the first month of the lunar year (paragraph 152 *supra*). When the Rāmāyana was first composed, i.e., some few centuries before the Christian era, we may be certain that the practice of casting horoscopes at the birth of a a child, however royal or divine, was entirely unknown, and it is very doubtful if the Hindus of that age were acquainted with the names, much less the movements, of any planets other than the sun and the moon. As already surmised (paragraph 245), the practice of casting horoscopes must have come into vogue about the time of Varāhamihira (sixth century A.D.) and the casting of Rāma's horoscope, whether it was deliberately cast with reference to a particular date, or merely imagined with reference to the supposed superexcellence of the planets presiding over his birth, may be ascribed to the fifth or sixth century A.D. (BENTLEY in his *Historical View of Hindu Astronomy* —vide page 115 below—ascribed it to the second or third century A.D.). There is good reason to suppose that the second of the motives here suggested really dictated the terms of this famous horoscope, the more so as we find exactly the same attempt made, and with the same planets, except Venus, in the case of Śankara's horoscope. Omitting Venus, we shall find that the same investigation, following the method indicated in this and the previous sections of this chapter, will do for both Rāma's and Śankara's horoscopes, supposing we decide to treat them as genuine horoscopes.

281. The mention of the month Chaitra as the twelfth month of the luni-solar year in the case of Rāma's horoscope is perfectly consistent with the solar month having been the first of the solar year, because we are given to understand, at any rate by a probable inference in the case of Rāma's horoscope, that the sun was in Mēsha.* In Śankara's horoscope, according to Mādhavāchārya's *Sankara-vijayam*, the Sun, Mars, Jupiter and Saturn were occupying exalted positions. That the moon at the time of Śankara's birth was in nakshatra Ārdrā and in the fifth śukla tithi is the common tradition and we may accept these details, at any rate, as a working hypothesis.

282. In order to determine the years in which Rāma's and Śankara's horoscopes would be true horoscopes, we may follow the method of investigation explained in detail in section ii of this chapter, paragraphs 250 to 255 supra. That is, we may first of all construct a table for a fixed year for which purpose we may again adopt the convenient year, 1 B.C. or A.D.0: this will suit both Rāma's and Śankara's horoscopes. Referring to paragraph 250 we notice that it is necessary first of all to settle as approximately as possible the day of the solar year corresponding to the horoscope. In the case of Rāma's horoscope, the tithi is śukla navamī in Mēsha month; and in the case of Śankara, it is śukla panchami in the same month. The lunar month to which these tithis belonged may have commenced a few days before Mēsha month or it may have commenced any time from 0 to 29½ days after the commencement of the Indian solar year, because we are not told whether the lunar month was Chaitra or (as in the case of Buddha) Vaiśākha. We may take ten days after the commencement of the Indian solar

* The well-known inconsistency in Rāma's horoscope, viz., that between the 9th tithi when the moon must have had a longitude of at least 96° and Punarvasu nakshatra which by all systems cannot extend beyond 93⅓° of longitude, may be mentioned parenthetically, but we do not propose to notice it further on this occasion.

year as a fair average for the ninth or fifth sukla tithi of the lunar month with which the horoscopes are concerned. The mean longitudes of the three major planets (neglecting Venus for the present) were :—

	Mars.	Jupiter.	Saturn.
Longitude on 0 day, A.D.0 (Table IV) ...	254·7	163·2	70·5
Mean motion for 10 days (Table IV) ...	5·2	0·8	0·3
	259·9	164·0	70·8
In whole numbers ...	260	164	71
To obtain the actual positions necessary for the two horoscopes, viz. ...	270° to 299°	90° to 119°	180° to 209°
We have, by the eye-table, as corresponding mean positions	240° to 270°*,	97° to 127°,	175° to 205°
To reach these mean positions, we have, in the case of Rāma's horoscope, to deduct from the positions on the tenth day of the Indian solar year A.D. 0; or add algebraically.	−350° to −20°,	−37° to −67°,	−226° to −256°
And in the case of Sankara's horoscope, we have to add	+340° to +10°,	+293° to +330°,	+105° to +140°

283. We have now to search in Table V-A for the following quantities which being subtracted, or added, as the case may require, will give us the positions required respectively for Rāma's and Śankara's horoscopes :—

	Mars.	Jupiter	Saturn.
Table V-A.—Subtract (for Rāma's horoscope) or add algebraically	−350° to −20°	−37° to −67°	−226° to −256°
Table V-A.—Add (for Śankara's horoscope)	+340° to +10°	+293 to +330°	+105° to +140°
We find without much difficulty that the following quantities, indicating the year A.D.0 minus 963, or 964 B.C., satisfy the mean longitudes of Rāma's horoscope,	−5°	−65°	−247°
while the following quantities from the same Table V-A, indicating the year A.D. 805, satisfy Śankara's horoscope ...	+1°	+310°	+116°

284. We have now to calculate the exact day of the solar year on which the tithi śukla 9 fell in the case of Rāma's horoscope and the tithi śukla 5 in the case of Śankara's horoscope.

Rāma's horoscope.	964, B.C.	First new moon in solar year.
Sūrya siddhānta Eye-table, **k** B.C. 1001	Mar. 5·2266	**l** 4·9123
n 37 years	·5740	**o** 10·4353
d 9 tithis		**d** 8·8592
	24·2068	24·2068
	March 30·0074	
Śankara's horoscope A.D. 805.		
Eye-table, **k** A.D. 800	Mar. 20·9883	**l** 8·1606
n (5 years)	·2938	**o** 4·6027
d (5 tithis)	...	**d** 4·9218
	17·6851	17·6851
A.D. 805	Mar. 38·9672 i.e., Ap. 7·9672	

We assume that Rāma's birth took place at the end of 24 days of the Indian solar year 964 B.C., and Śankara's at the end of 18 days of the Indian solar year, A.D. 805, and proceed to verify the two horoscopes with the aid of Tables V-A and V-B.

285. From Table V-A we learn that the positions (true geocentric places, not merely mean longitudes) of the several planets on the twenty-fourth day, 964 B.C.

* The necessity for a reference to Mars' Eye-table has been pointed out in paragraph 258 supra; it was pointed out in the same place that the Eye-table is not so necessary in the case of Jupiter and Saturn.

(= A.D. 0 *minus* 963), and on the eighteenth day, A.D. 805, were, practically and, except for small cyclic variations, very nearly, the same as their positions in certain years of the current cycle (Table V-B).

Years in the current cycle (Table V-B) when the several planets attained the positions required for the two horoscopes.

—	Mars.	Jupiter.	Venus.	Saturn.
Rāma's horoscope— Table V-A, 24th day, B.C. 964, or A D. 0 *minus* 963, corresponds in the current cycle, to 24th day of	A.D. 1862	A.D. 1801	A.D. 1881	A.D. 1718
Table V-B, on the 24th day of these several years the planets' geocentric places and the cyclic variations were	= 298·0° – ·3° or 297·7° (28° in Makara)	= 94·7° – ·3° or 94·4° (4° in Kaṭaka).	= 21·3° (in Mesha)	= 188·1° + ·7° or 188·8° (8° in Tula)
Śankara's horoscope— Table V-A, 18th day, 805 A.D., corresponds in the current cycle, to 18th day of	A.D. 1894	A.D. 1671	..	A.D. 1954
Table V-B, on the 18th day of these several years the planets' geocentric places, and the cyclic variations were	= 299·0° – ·3° or 298·7° (19° in Makara)	= 108·2° + ·20 or 108·4° (18° in Kaṭaka).	..	= 192·9° + ·3° or 193·2° (13° in Tulā)

N.B.—(1) In taking out the geocentric places from Table V-B, we should remember that that table gives the position for every tenth day in the year and that for intermediate days we should take proportional parts. Thus, for Mars' position in Rama's horoscope we have to take the position of the planet on the twenty-fourth day of A.D. 1862 and subtract ·3°. Now the position of Mars on the 20th day of A.D. 1862 was by table V-B, 295·3° and on the 30th day 302·1°, increase for 10 days, 6·8°: therefore, the increase for 4 days is 4 × ·68 = 2·72°, or 2·7° and Mars' position on the 24th day of 1862 A.D. was therefore 295·3° + 2·7° = 298·0°, while its position on the twenty-fourth day of B.C. 964, was 298·0 – ·3° = 297·7° or 18° in Makara. We have to proceed in the same way for all the other planets.

(2) The positions in the two years, 964 B.C. and A.D. 805 are the positions required by the horoscopes (if we remember that the solar month in both cases was Mesha and that the sun was therefore in his house of exaltation, equally with the other planets named above); but in Rāma's horoscope Venus ought to be in Mina (330° to 360°) according to Vālmiki whereas on the 24th day in B.C. 964, Venus' position was 21·3° or 21 degrees beyond Mina.

When we come to study more closely the movements of Venus, we shall find that in most years she is in or beyond Mēsha at the beginning of the Indian solar year: that only in certain years she is at this time in Mīna (330° to 359°); that once she is in Mīna, she continues to return thereto every 8 years; and that lastly, 964 B.C., was not the kind of year when Venus would in Mēsha month be in the constellation Mīna.

Evidently we have to make a second attempt, as we did in the case of the Paripādal horoscope, in section (ii), paragraph 263, and for the same reason, namely, that we have failed so far to get a correct position for Venus. But before doing so we may devote some time to a consideration of Bentley's solution of this problem.

286. In a well-known and otherwise valuable and suggestive work entitled "*Historical View of Hindu Astronomy*" (1825), Bentley says:—

"According to the Rāmāyana, called Valmiki's, five of the planets were in their houses of exaltation, as the astrologers term it, at the birth of Rāma, that is to say, sun in Aries, moon in Cancer, Venus in Pisces, Jupiter in Cancer, Mars in Capricorn, Saturn in Libra, on the ninth lunar day of Chaitra. The position of the planets here given, I strongly suspect, are the result of modern computation and not from actual observation; for the signs of the ecliptic, at least by these names, were totally unknown in the time of Rāma and were not introduced into India until the second or third century A.D.

Rāma born on 6th April 961 B.C.

(By Lalande's tables.)

	s	°	'	"	
Sun	0	6	11	23	Aries.
Moon	3	12	13	54	Cancer.
Venus	11	1	0	0	Pisces.
Mars	10	2	47	0	Capricorn.
Jupiter	4	6	24	13	Cancer.
Saturn	6	8	27	0	Libra.

in which Jupiter is only 6° 24′ 13″ beyond the limit and Mars 2° 47′. Rāmāyana, B.I Sarga 3, Verse 16."

287. The reader who has carefully noted the mean annual movements of the planets (paragraph 222 *supra*) will probably be inclined to ask how it was possible for Jupiter and Saturn which were in certain signs in 961 B.C. according to Bentley to occupy the same signs in 964 B.C. according to paragraph 285 *supra*. We found that Jupiter's position in 964 B.C. on Mēsha sukla navamī was, according to the Ephemeris, 94·4° while, according to Bentley, on much the same solar day in 961 B.C., his position was 126·3°, an advance of 32° for three years, whereas Jupiter advances at least 30° every year or 90° in three years. Again Saturn's position, according to the Ephemeris, on Mēsha sukla navamī in 964 B.C. was 188·8° or 189° whereas, according to Bentley, he was in the same sign in 961 B.C. and was occupying a position defined by Lalande's Tables as 188·4°. That Saturn in 3 years should not have moved even one degree must land the reader in the conviction that either Bentley or the Ephemeris is wrong.

288. In the first place, we observe that Bentley assigns to the sun only 6° of longitude on Ap. 6, 961 B.C.; in other words that 6th April was, according to him, the sixth or seventh day of the solar year, whereas we know from Eye-table sec. **k** that it was not till A.D. 1751 that the Indian solar year began to commence as late as March 29, and that 6th April was only then the eighth day of the Indian solar year. We know also from section **k** of the Eye-table that in 961 B.C., April 7 was the thirty-second day, and not the seventh day of the Indian solar year.

289. An explanation of these serious discrepancies between Bentley's figures and those furnished by the *Ephemeris* is to be found in the facts that Bentley follows the ordinary European reckoning of celestial longitude (vide paragraph 230 supra) which starts from the First Point of Aries, or the meeting point of the equator and the ecliptic; whereas Indian celestial longitudes are reckoned from this meeting point as it stood in a particular year, *circa* A.D. 532; that on account of precession, the First Point of Aries has since A.D. 532, moved westward at the rate of 50 seconds of an arc per annum; that for every year before A.D. 532, the First Point of Aries must be shifted to a position east of that which it occupied in A.D. 532; that in 963 B.C. the First Point of Aries was fully 24·3 degrees (paragraph 229) east of the point where Indian celestial longitudes commence; that consequently in order to convert the positions in Bentley's horoscope into those of an Indian horoscope, we should add about 24·5 degrees to each of Bentley's positions; in other words, Bentley's horoscope would read as follows in terms of the Indian sidereal year:—

Sun	30° 41′
Moon	126° 43′
Venus	355° 30′
Mars	327° 17′
Jupiter	150° 54′
Saturn	210° 57′

290. According to Bentley's horoscope, sidereally construed, none of the planets except Venus was in the position required for Rāma's horoscope, unless we suppose that the framers of that horoscope used the system of tropical celestial longitudes which has been for a long time current in Europe but which, so far as is known, has never been adopted in this country, and in fact could not have been adopted here at any time, since the Indian astronomers, before Bhāskara's time (twelfth century A.D.) either were ignorant of, or misunderstood, the precise effect of precession (see WHITNEY and BURGESS' *Sūrya siddhānta*—1865). The Hindus no doubt used a tropical year until about A.D. 532, but they imagined that it was, or was bound to be, of the same length as the sidereal year, and they reckoned celestial longitudes, not from the First Point of Aries which is a point created by, and for, spherical astronomy, but from a fixed constellation in the heavens, which was *Krittikā* long before A.D. 532, and *Aśvinī* since that year.

291. It is possible that Bentley thought that for Rāma's epoch the celestial longitudes of heavenly bodies would be the same, whether reckoned, by the tropical system from the European First Point of Aries, or from Krittika by the

sidereal system, because the interval between the First Point of Aries of 961 B.C. and that of A.D. 532 is 24·5 degrees and the interval between the commencement of Kṛittikā and the commencement of Asvinī is 26°·40′, a difference of only 2 degrees and ten minutes. But our complaint against Bentley's horoscope is not merely that his positions are reckoned from Kṛittikā or from the First Point of Aries, but that they do not yield the particular rāśis or constellations indicated in Rāma's horoscope. The reader should remember that when a European astronomer speaks of the *sign Cancer*, for instance, he does not mean the *constellation* called Cancer or Karkaṭaka which is composed of certain fixed stars called *a Cancri*, *β Cancri* and so forth, but merely a part of the ecliptic removed by 90° to 119° from the point which happens at that particular epoch to be the First Point of Aries or the meeting point of the ecliptic and the equator. Some confusion necessarily underlies this mode of speech of European astronomers and in order to obviate it, they use the expression *sign* or *sign of the zodiac* when they mean a division of the ecliptic with reference to the moveable First Point of Aries; and the expression *constellation* or *constellation of the zodiac* when they mean a particular group of fixed stars. In Indian usage, whether astronomic or popular, there has never been any distinction between a *sign of the zodiac* and a *constellation of the zodiac*, and a horoscope gives the position of a planet located in a particular group of fixed stars, or somewhere near it, whereas in European astronomy the sign *Pisces* with reference to 2500 B.C., for instance, means an arc of 30° in the ecliptic, actually occupied in part by the *constellation* Aries (Mēsha) and in part by the *constellation* Taurus (Ṛishabha) and therefore 50 degrees distant from the *constellation Pisces* or *Mīna*.

292. We have not quite done with our criticism of Bentley's version of Rāma's horoscope. If we compare again the Ephemeris version of Rāma's horoscope in paragraph 285 supra, where we assumed the horoscope to be one of the year 964 B.C., and Bentley's version, read in terms of Indian sidereal longitude (vide paragraph 289 supra), we shall see that the advance in Jupiter's position from 964 B.C. (according to the Ephemeris) to 961 B.C. (Bentley, after allowing for precession) is 56 degrees and the advance of Saturn from the former to the latter year is 22 degrees. Now these advances are the advances of Jupiter and Saturn respectively for two years and not for three years, and we may suspect that Bentley's positions belong to 962 B.C. or A.D. 0 *minus* 961, not to 961 B.C. or A.D. 0 *minus* 960. In fact if we determine the positions of the planets in 962 B.C. according to Tables V-A and V-B of the Ephemeris, we shall find them to be as follows :—

B.C. 962 ; 31 complete days of the Indian solar year, when the moon had reached the 9th tithi—

English date		Sun.	Mars.	Jupiter.	Venus.	Saturn
6th April B.C. 962	...	30°	324·6°	152·9°	356·0°	215·0°

These positions are in every case, within 2° of Bentley's positions— vide paragraph 289 supra. We may conclude that Bentley, when referring to B.C. 961, really meant B.C. 962 and ought to have said—as astronomers do in such cases—"A.D. *minus* 961" ; and that the positions of his planets as given by him, are *tropical* not *sidereal*.

293. We may now resume the consideration of Rāma's horoscope. Having failed (vide paragraph 285) to locate it in its entirety in 964 B.C., and having satisfied ourselves that Bentley's identification, referring really to 962 B.C., is not such as to satisfy the conditions of an Indian horoscope, we may still wish to ascertain whether there is any year within the traditional period of Indian history (we shall have something to say later, vide paragraph 300, as to the limits of the traditional period itself) when Vālmīki's horoscope would have been a true horoscope for a child born in that year, whether that child was Rāma or any other. This is a legitimate curiosity, and considering the interest which must always attach to any legitimate search for Rāma's horoscope, and so long as we are in a position to indulge it, historical considerations may for the moment be held in abeyance.

294. The general procedure is that indicated in paragraph 250 supra. Failing 964 B.C., we may wish to search in a remoter past, but Table V-A gives a list of

B.C. years only up to 1024 B.C. If we want to go further back, all we have to do is to select for our fixed year, 1501 B.C., 2501 B.C. or 3102 B.C. (the year 0 of Kaliyuga). If we propound to ourselves the problem, what year or years since 3102 B.C. up to date satisfied Rama's horoscope, we might divide the problem into two parts: (1) what years between 3102 B.C. and 1101 B.C. satisfied the conditions; and (2) what years between 1101 B.C. and A.D. 900 satisfied the conditions.

In this way our operations will be throughout additive and we shall avoid the inconvenience of subtraction or the algebraic addition of minus quantities; vide paragraph 257 supra.

For the first part of the problem we have to start as follows with 3102 B.C. as our fixed year.

3102 B.C. (Tables IV and IV-A).	Mars.	Jupiter.	Saturn.
Mean longitude on 0 day of solar year.	347·0°	15·7°	339·2°
Add for mean motion for 10 days of solar year	5·2°	0·8°	0·3°
	352·2°	16·5°	339·5°
In nearest whole degrees	352°	17°	340°
Actual geocentric places of which we are in search	270° to 299°	90° to 119°	180° to 209°
Corresponding mean positions (by Eye-Table) as before (paragraph 282) ..	240° to 270°	97° to 127°	175° to 205°
Wanted increase to mean longitude of year 3102 B.C., 10th solar day, of ...	+248° to +278°	+80° to +110°	+200° to +230°

1	2	3	4	5	6	7	8	9	10	11	12
Calculation for day of solar year.	Years from 3102 B.C	Mars.	Jup.	Sat.	B.C.	A.D.	Day of solar year.	Mars.	Jup	Venus.	Sat.
Eye-tab. l, o, d.		(Increases of longitude by Table V-A.)			(3102 minus yr. in Col. 2.)		(Col. 1.)	(See explanation in paragraph 296.)			
3001 B.C. 24·27 93 years 20 64 9 tithis 8·86 58·77 29 53 24·24	193	221	97	198	2909	−2908	24	4277 yrs. −2908 „ A.D. 1369 +363 1762 *231°*	4318 yrs. −2908 „ A D. 1410 +344 A.D. 1754 **107°**	4270 yrs. −2908 „ A.D. 1362 +478 A.D. 1840 *1·2°*	4272 yrs. −2908 „ A.D. 1364 +383 A.D. 1747 **183°**
2801 B.C. 1·66 69 years 16·27 9 tithis 8·86 26·79	370	258	69	201	2732	−2731	27	4277 yrs. −2731 „ A.D. 1546 +363 A.D. 1909 **295°**	4318 yrs. −2731 „ A.D. 1587 +344 A.D. 1931 *82°* (*a*)	4270 yrs. −2731 „ A.D. 1539 +235 A.D 1774 **344°**	4272 yrs. −2731 „ A.D. 1541 +383 A.D. 1924 **185°**
2501 B.C. 12·05 66 years 18·42 9 tithis 8·86 40·32 29·53 10 79	667	227	82	230	2435	−2434	10	4277 yrs. −2434 „ A.D. 1843 *240°*	4318 yrs. −2434 „ A.D. 1884 **94°** (*a*)	4270 yrs. −2434 „ A.D. 1836 *53·5°*	4272 yrs. −2434 „ A.D. 1838 *215°* (*d*)
2101 B.C. 25 89 46 years 1·00 9 tithis 8·86 35·75 29·53 6 22	1047	241	94	193	2055	−2054	6	3551 yrs. −2054 „ A.D. 1497 +363 A.D. 1860 **260°** (*b*)	3369 yrs. −2054 „ A.D. 1315 +605 A.D. 1920 **104°** (*c*)	3557 yrs. −2054 „ A.D. 1503 +470 A.D. 1973 **7°** (*e*)	5300 yrs. −2546 „ A.D. 1452 +383 A.D. 1835 **179°** (*f*)

(*a*) Jupiter's place was less advanced at the time by Sūrya siddhānta than by Ephemeris.
(*b*) Mars at the time was +9° by Sūrya siddhānta.
(*c*) Jupiter was 11° less advanced at the time by Sūrya siddhānta.
(*d*) Saturn at the time was 15° in advance by Sūrya siddhānta.
(*e*) If we allow 25° less for Venus' mean longitude, its actual place was by eye-table, **358·0°** by Sūrya siddhānta.
(*f*) Saturn was at the time 10 degrees in advance of this by Sūrya siddhānta.

1	2	3	4	5	6	7	8	9	10	11	12
Calculation for day of solar year.	Years from 3102 B.C.	Mars.	Jup.	Sat.	B.C.	A.D.	Day of solar year.	Mars.	Jup.	Ven.	Sat.
Eye-tab. **1, o, d**		(Increases of longitude by Table V-A.)			(3102 *minus* yr. in Col. 2).		(Col. 1.)	(See explanation in paragraph 296.)			
1901 B.C. 3·29 83 years 11·44 9 tithis 8·86 23 59	1284	244	86	209	1818	−1817	24	3551 yrs. −1817 „ A.D. 1734 **274°**	3369 yrs. −1817 „ A.D. 1552 344 A.D. 1896 **97°**	3557 yrs. −1817 „ A.D. 1740 235 1975 *64°*	3506 yrs. −1817 „ A.D. 1689 ... **194°**
1201 B.C. 27·52 60 years 25·70 9 tithis 8·86 62·08 59·06 3 02	1961	226	111	202	1141	−1140	3	2178 yrs. −1140 „ A.D. 1038 +726 A.D. 1764 *237°*	2159 yrs. −1140 „ A.D. 1019 +949 A.D. 1968 **121°** (*a*)	2139 yrs. −1140 „ A.D. 999 +948 A.D. 1947 **327°**	2298 yrs. −1140 „ A.D. 1158 +766 A.D. 1924 **187°**
1201 B.C. 27·52 9 tithis 8·86 36·38 29·53 6·85	1901	261	90	188	1201	−1200	7	2178 yrs. −1200 „ A.D. 978 +726 A.D. 1704 **285°**	2159 yrs. −1200 „ A.D. 959 +949 A.D. 1908 **100°**	2139 yrs. −1200 „ A.D. 939 +948 A.D. 1887 *38°*	2298 yrs. −1200 „ A.D. 1098 +766 A.D. 1864 **173°**

For the second part of the problem we start with 1101 B.C.

	Mars.	Jup.	Sat.
1101 B.C. 0 day, mean long.	309°	261°	310°
10 days ...	5·2°	0·8°	0·3°
	314°	262°	310°
Wanted	270° to 299°	90° to 119°	180° to 209°
Wanted corresponding mean positions (Eye-table)	240° to 270°	97° to 127°	175° to 205°
Increases sought. ..	+285° to 315°	+195° to +225°	+225° to 255°

1	2	3	4	5	6	7	8	9	10	11	12
Calculation for day of solar year.	Years from 1101 B.C.	Mars.	Jup.	Sat.	B.C.	A.D.	Day of solar year.	Mars.	Jup.	Ven.	Sat.
Eye-tab. **1, o, d.**		(Increases of longitude by Table V-A.)			(1101 *minus* yr. in Col. 2.)		(Col. 1.)	(See explanation in paragraph 296.)			
1001 B.C. 4·91 87 years 10·43 9 tithis 8·86 24·20	137	302	198	234	964	−963	24	2178 yrs. −963 „ A.D. 1215 +726 A.D. 1941 **298°**	2159 yrs. −963 „ A.D. 1196 +688 A.D. 1884 *94°* (*b*)	2139 yrs. −963 „ A.D. 1176 +705 A.D. 1881 *21°* (*c*)	2298 yrs. −963 „ A.D. 1335 +383 A.D. 1718 **188°**
801 B.C. 11·84 74 years 20·87 9 tithis 8·86 41·57 29·53 12·04	374	305	190	250	727	−726	12	A.D. 1786 **296°**	A.D. 1777 *85°*	A.D. 1883 **332°**	A.D. 1955 **206°**

(*a*) Jupiter at the time was 7° less by Sūrya siddhānta than by Ephemeris.
(*b*) Jupiter's place at the time was 6° less by Sūrya siddhānta than by Ephemeris.
(*c*) Venus' place at the time, by Sūrya siddhānta, was 53°, i.e., in Rishabha rāśi, not in Mīna.

1 Calculation for day of solar year.		2 Years from 1101 B.C.	3 Mars.	4 Jup.	5 Sat.	6 B.C.	7 A.D.	8 Day of solar year.	9 Mars.	10 Jup.	11 Ven.	12 Sat
Eye-tab. **1, o, d.**			(Increases of longitude by Table V-A.)			(1101 *minus* yr in Col. 2.)		(Col 1.)	(See explanation in paragraph 296)			
301 B.C. 14 years 9 tithis	29 14 24 70 8 86 62·70 59·06 3·64	814	284	223	226	287	−286	4	A.D. 1813 **265°** (*a*)	A.D. 1878 **118°**	A.D. 1845 **356°**	A.D. 1927 **178°** (*b*)
201 B.C. 91 years 9 tithis	3·07 12·89 8·86 25·82	991	322	195	229	110	−109	26	A.D. 1706 *317°*	A.D. 1706 *90°* (*c*)	A.D. 1787 **344°**	A.D. 1806 **184°**
101 B.C. 51 years 9 tithis	6·5 5 6 8·8 20·9	1051	287	215	242	50	− 49	21	A.D. 1766 **279°**	A.D. 1766 **109°**	A.D. 1847 *53°*	A.D. 1866 **197°**
100 A.D. 88 years 9 tithis	13·5 16·0 8·9 38·4 29·5 8·9	1288	290	207	258	...	A.D. + 188	9	A.D. 1640 **276°**	A.D. 1742 **102°**	A.D. 1849 *40°*	A.D. 1720 *212°* (*b*)
See Table II	5	1668	304	219	221	...	568	5	A.D. 1657 **287·4°**	A.D. 1778 **114°**	A.D. 1994 *27°*	A.D. 1717 **177°** (*d*)
See Table II	21	1905	307	212	237	...	805	21	A.D. 1894 **300°**	A.D. 1754 **107°**	A.D. 1988 *62°*	A.D. 1954 **192°**

295. The two tables set out above contain the results of an exhaustive search for Rāma's horoscope, extending over a period of 4,000 years from 3102 B.C., the year 0 of Kaliyuga, to A.D. 900. Apart from the opportunity which they afford us of substantiating the claim advanced in paragraph 257 supra, viz., that by means of Tables V-A and V-B it is possible to review the geocentric places of 5 planets during a period of 4,000 years, our present investigation table may be made to serve a quasi-historic purpose. (1) The framer of Rāma's horoscope may have had in view not an actual year or an actual horoscope, but only an ideal horoscope in which five planets occupied exalted positions. If so, the search for a year in which the five planets actually occupied such positions ranks no higher than as an astronomical pastime and is in no sense an historical problem. (2) For the reasons stated in paragraphs 245 and 280 supra, we must, as serious critics, dismiss the supposition that Rāma's horoscope was actually calculated at the time of his birth and that, in the absence of writing, the details of that horoscope were preserved by tradition from Rāma's epoch down to the time when the horoscope was inserted in Vālmīki's Rāmāyaṇa. (3) It remains to consider a third alternative, viz., that somebody, during the period when a study of planetary astrology was possible in India, viz., the period since about A.D. 300, actually noticed a year when the five planets occupied exalted positions, and framed Rāma's horoscope in imitation of that actual horoscope. If the year, or one of the years, when the five planets occupied exalted positions was comprised in what we may designate the astrological period, i.e., the period since A.D. 300 and if it also was a year in which it was possible for Rāma's horoscope to be interpolated or inserted in the Rāmāyaṇa, then the investigation will have served the quasi-historical purpose of indicating the probable time when this interesting interpolation in the text of the Rāmāyaṇa was carried out.

296. Now which of these alternatives does the investigation we have just concluded serve to establish? By its means we satisfied ourselves, in the first place, that there were only 15 years since 3102 B.C. when the 5 planets, Sun, Mars, Jupiter, Venus and Saturn were so placed that they *could* reach exalted positions in the month of Mēsha. These years are 2909, 2732, 2435, 2055, 1818, 1201, 1141, 964, 727, 287, 110, 50 B.C. and A.D. 188, 568 and 805. We next calculated, in

(*a*) Mars at the time was 6 to 5° in advance of this by Sūrya siddhānta; it is, therefore, regarded as a suitable position.
(*b*) Saturn at the time was 6° more advanced by Sūrya siddhānta than by Ephemeris.
(*c*) Jupiter's place at the time 3° less by Sūrya siddhānta than by Ephemeris.
(*d*) Saturn at the time stood 3·2 degrees further by Sūrya siddhānta than by Ephemeris.

column 1 of the table, on what day of the Indian solar year, the mean tithi śukla navamī in Mēsha month actually fell in each of these years. We did not calculate the actual ending moment of the tithi, because that would affect our result only to the extent of half-a-day (paragraph 28 *supra*). Nor did we calculate the equivalent English date in each case, as this is a detail which can easily be supplied from Eye-table **k** and **n** when we know the year.

As a third step, we filled up columns 9 to 12 of our investigation table, first, with the year in the current cycle of each planet when it attained the same position as in the year entered in columns 6 and 7. By "current cycle" we of course mean the cycles of years, 383, 363, 355, 344 and 235 for which the actual geocentric places of the five planets Saturn, Mars, Mercury, Jupiter and Venus respectively for every tenth day are furnished in Table V-B. Table V-A enables us to fill up columns 9 to 12 of our investigation table from the year 1024 B.C. to the year A.D. 2005. For years before 1024 B.C. we use, in filling up columns 9 to 12, the major cycles given at the beginning of Table V-A in combination with the by-now familiar cycles of 363, 344, 235 and 383 cycles for Mars, Jupiter, Venus and Saturn, respectively. Lastly in columns 9 to 12, we noted any suitable results reached by us by means of heavy type numerals, and unsuitable results by means of italic numerals.

297. The geocentric places thus arrived at are correct astronomical places, with, in any case, a probable error not exceeding a degree either way. But we have also to bear in mind that the mean places assumed in Indian astronomy for the different planets at the epoch 0 Kaliyuga were not the correct places by modern astronomy, which it is the object of the Ephemeris to reproduce, but a mean longitude of 0 degree *in every case* (*Sūrya siddhānta* I. 57). As the centuries advanced from 0 Kaliyuga, the differences between Sūrya siddhānta without *bīja* and modern astronomy underwent variations which are tabulated below ; and by A.D. 900 there was practically no difference between the mean places of planets by Sūrya siddhānta (without *bīja*) and those deduced by modern astronomy. Since A.D. 900 differences have accumulated again, and this is the period when *bījas* or corrections were introduced by Indian astronomers to bring the planetary positions, as calculated by them, into accord with actual observation (see paragraph 268 *supra*).

The following quantities, extracted from Table IV-B, have to be added, or subtracted (as the case may be), in order to obtain Sūrya siddhānta mean positions of planets at different epochs from the standard positions deduced from the Ephemeris Tables V-A and V-B :—

B.C.		Mars.	Jupiter.	Saturn.	Venus.	Mercury.
3101	...	+ 11·9	− 15·9	+ 20 7	− 33·0	+ 33 0
2101	...	+ 9 2	− 11·7	+ 15 7	− 24·9	+ 28·9
1101	..	+ 6·6	− 7·5	+ 10 7	− 16 7	+ 24 7
101	...	+ 4 0	− 3 2	+ 5·7	− 8 6	+ 20 5
A.D.						
900	...	+ 1·3	+ 1·0	+ 0·7	− 0·4	+ 16·3
1900	..	− 1·3	+ 5·2	− 4 3	+ 7·7	+ 12 1

298. At a first glance, and judged by Indian Ephemeris figures, without correction for Sūrya siddhānta, none of the 15 possible years since 3102 B.C. could have yielded a horoscope satisfying all the conditions of Rāma's horoscope. In ten years, 2909. 2435, 2055, 1818, 1201, 964, 50 B.C , and A.D. 188, 568, and 805, Venus was not in Mīna, but in Mēsha or Ṛishabha, and in one case in Mithuna. [In one of these years 2055 B.C., which was otherwise suitable, Venus was only 7° beyond Mīna, and this is a case which we shall have to re-consider later, first because if we make the correction for Venus' mean longitude according to Sūrya siddhānta suitable for the epoch, viz.,—25° as compared with Ephemeris, we shall find that by the Eye-table for Venus the actual geocentric place of Venus at the end of six days of the Indian solar year in 2055 B.C. must have been 358·0° which was in Mīna rāśi as required by Rāma's horoscope ; and secondly, because Mars' position on the same day by Sūrya siddhānta, was 260·6° (the position by Ephemeris) + 9·2 = 269·8°, which is within a few minutes of Makara rāśi (270°), the position required by Rāma's horoscope.]

Mars.—**In three of the 15 years entered in our investigation tables, viz., 2909, 2435, 1141 B.C., Mars was so far short of Makara that even the addition required by Sūrya siddhānta would not make up for the deficiency. In two years, 2055 B.C.**

(already adverted to in the last sub-paragraph) and 287 B.C., Mars' position was 260·6° and 265° respectively by Ephemeris, but by Sūrya siddhānta it would have been 269·8° and 270° respectively, which would satisfy Rāma's horoscope. We shall, therefore, have to review these two years separately, as the other planets then occupied suitable positions.

299. *Jupiter.*—In two of the 15 possible years 2732 B.C. and 727 B.C., Jupiter's position by the Ephemeris was 82° and 85° respectively. In the case of Jupiter, the conversion from Ephemeris to Sūrya siddhānta positions at the epoch in question requires a *deduction*, not an *addition*: if we make the appropriate deduction, we shall find that Jupiter's actual geocentric place on *śukla navami* in Mēsha month in 2732 B.C. was 68° while his place on the same tithi in 727 B.C. was 79°. Neither of these positions suits Rāma's horoscope.

Saturn.—In two of the fifteen possible years, viz., 2435 B.C. and A.D. 100, which are equally unsuitable for Venus, the position of Saturn by the Ephemeris was in excess of that required by Rāma's horoscope, and by Sūrya siddhānta, Saturn's position in those years would have been still more in excess. In two other years, 2055 B.C. and 287 B.C., Saturn's position by the Ephemeris was 179 and 178 degrees respectively, but by Sūrya siddhānta, he would have attained 194° and 184° respectively which would satisfy Rāma's horoscope.

300. To enable the eye to take in rapidly the results of each year investigated on pages 118, 119, the position of any planet suitable for Rāma's horoscope is indicated in heavy arabic numerals and the reverse in italic numerals. Reviewing the fifteen years' tabulated results as a whole, we find that by Sūrya siddhānta the conditions of Rāma's horoscope would have been fully satisfied in two years, 2055 B.C. and 287 B.C. The positions were, by Sūrya siddhānta,

	Sun.	Mars.	Jupiter.	Venus.	Saturn.
2055 B.C.	7°	270°	93°	358°	194°
287 B.C.	5°	270°	114°	356° [or somewhat less, but still in Mīna]	184°
Rāsi and house of exaltation for each planet.	Mēsha.	Makara.	Karkaṭaka.	Mīna.	Tulā.

To what extent historical or literary criticism will be able to turn to account these two dates for Rāma's horoscope is a speculation on which it would be foreign to our purpose to enter at present. We set out in paragraph 294 with the single proposition, namely, to try and discover the year or years between 3102 B.C. and A.D. 900, which would satisfy Rāma's horoscope and we have reached two astronomically correct solutions of this problem, understanding, of course, by astronomy the Indian science, and more particularly, the system of the Sūrya siddhānta without *bīja*. 2055 B.C. may be considered too remote for any historical or quasi-historical speculation. 287 B.C. was about the epoch when the Ramāyaṇa epic was in process of evolution and construction, but data are as yet wanting to enable us to affirm that Indian astronomers of that time had the knowledge requisite for the construction of a horoscope like Rāma's

301. We may note in passing that the last of the possible years in our investigation table, viz., A.D. 805 is a year which satisfies Śankara's horoscope. It fails altogether to give a position for Venus that would satisfy Rāma's horoscope, but Venus was not in exaltation in Śankara's horoscope in which only the four remaining planets Sun, Mars, Jupiter and Saturn were in exaltation. It has been sometimes assumed that A.D. 805 is the only year that satisfies Śankara's horoscope; but we may note that not only A.D. 805 but also A.D. 568, 50 B.C. and 287 B.C. satisfy Śankara's horoscope. In *Ind. Antiq.*, Vol. XIII (Ap. 1884), Mr. K. T. Telang wrote as follows: "I am content to accept the beginning of the seventh century A.D. as a period down to which we can trace Pūrṇavarma as reigning in Magadha and that is about the time, therefore, when Sankarachārya must have composed his great *Śārīraka Bhāshya.*"

302. Incidentally we may note that the year 964 B.C. which is one of 15 possible years for Rāma's horoscope, and not a particularly good one either (because it shares with other years in the series the defect of an unsuitable position for Venus—vide paragraph 285 *supra*), is marred by another serious defect, viz., a position for Jupiter (94·4°) which though one of exaltation (i.e., in Karkaṭaka rāśi) by the Ephemeris, is not so by Sūrya siddhānta, because at the epoch in

question, according to the small table in paragraph 297 *supra*, the position of Jupiter by Sūrya siddhānta without *bīja* was 7 degrees less than by the Ephemeris ; in other words, the position of Jupiter by Sūrya siddhānta on *śukla navamī* tithi in Mēsha month in the year 964 B.C. was 94·4° *less* 7°, or 87·4° which would have been 3 degrees short of Karkataka. Considering the importance of Jupiter in an Indian horoscope, let alone Rāma's in whose horoscope it is all in all, we must finally discard 964 B.C. as being an impossible year for Rāma's horoscope.

303. Tables V-A and V-B, being based on the constants of modern astronomy, will be found serviceable in verifying statements occurring in any literature, ancient or modern, regarding the positions of planets. We read, at page 4 of LOCKYER's *Star-gazing*, of a Chinese observation of the conjunction of 5 (*sic*) planets between 2514 and 2436 B.C. The same occasion is apparently referred to in CHAMBERS' *Sun, Planets and Comets*, where we read : "The earliest record we possess of an occurrence of this kind is for China. A conjunction of Mars, Jupiter, Saturn and Mercury in the constellation of *Shi* was assumed as an epoch by the Emperor Chuen-hio and it has been found by Messrs. Desvignoles and Kirch that such a conjunction actually took place on 18 February 2446 B.C. between 10° and 18° of Pisces. De Mailla fixes 9 February 2441 B.C. as the date of the conjunction and says that the four planets, with the moon, were comprised within an arc of 12° extending from 15° to 27° of Pisces.

De Mailla gives the following positions :—

Mercury, R.A....	344° 56′ 16″	Saturn	354° 39′ 47″
Jupiter ...	347° 2′ 12″	Mars	356° 45′ 11″ "
Moon ...	353° 18′ 21″		

304. In the first place it is not possible that both Desvignoles and De Mailla can be correct, since between 18 February 2446 B.C. and 9 February 2441 B.C. Jupiter must have moved 150° or 5 signs and Saturn 60° or 2 signs. In the second place, it is easy to satisfy ourselves, with the aid of tables V-A and V-B, that neither of the above dates is correct. But before doing so, we should observe, as we did in paragraph 289 *supra*, that in European astronomy longitudes are reckoned from the First Point of Aries. In this case we may assume De Mailla's positions in R.A. (Right Ascension) to be tropical longitudes, and convert them into Indian sidereal longitudes by adding to each position 49°, which was the distance from the First Point of Aries in 2500 B.C. to the 0 degree of the sun's mean longitude in the same year in the Indian ecliptic. We then have the following as De Mailla's positions for 9th February 2441 B.C., expressed in terms of Indian sidereal longitude :—

Mars 46° (rounding off fractions of a degree) ; Mercury 34° ; Jupiter 36° ; Saturn 44° ; Moon 42°.

In 2441 B.C. the Indian solar year began on February 21, because in 2501 B.C., the Indian solar year began on Feb. 21·09 (Eye-table, section **k**)
and for 60 years from 2441 B.C. we add ... ·52 (Eye-table, section **n**).

Feb. 21·61·

Therefore 9 February in 2441 B.C. was about 12 days before the commencement of the Indian solar year. Consequently at the commencement of the solar year 2441 B.C., Mars would be about 6 degrees further than on 9 February and Mercury about 12 degrees further, while Jupiter and Saturn would be very much in the same position. We can, therefore, apply a preliminary test by calculating, with the help of tables V-A and V-B, the positions of the 4 planets on 0 day of the Indian solar year 2441 B.C. Applying the large cycles found at the beginning of table V-A, we have, for the positions of the planets on 0 day of Indian solar year 2441 B.C.,—

	Mars.	Mercury.	Jupiter.	Saturn.
	4277 yrs.	4306 yrs.	4318 yrs.	4272 yrs.
	— 2440 „	— 2440 „	— 2440 „	— 2440 „
	A.D. 1837	A.D. 1866	A.D. 1878	A.D. 1832
(Table V-B)	110°	9°	282°	140°
353rd day of previous year or 9 February 2441 B.C. ...	104°	0°	281	139°

305. Evidently, there was no conjunction of the four planets in question, or of even of two of them, on 9 February 2441 B.C., and there must be a mistake somewhere. Using the indications furnished by De Mailla's positions for Mercury and the moon, we may conjecture that the date he had in mind was somewhere about 2 March 2449 B.C., or the 10th day of the Indian solar year, 2449 B.C. For, applying the same major cycles as before, we have, for 10th day of 2449 B.C.,—

	Mars.	Mercury.	Jupiter.	Saturn.
	4277 yrs.	4306 yrs.	4318 yrs.	4272 yrs.
	— 2448 „	— 2448 „	— 2448 „	— 2448 „
	A.D. 1829	A.D. 1858	A.D. 1870	A.D. 1824
10th day of 2449 B.C. (2 March 2449 B.C.) ...	46°	28°	32°	34°
Cf. De Mailla's positions (converted into Indian sidereal longitudes) paragraph 304 ...	46°	34°	36°	44°

For the moon's position on the same day, we proceed as follows:—

(Eye-table, section **k, l, n, o**.)	2501 B.C., commencement of Indian solar year, Feb. 21·09, 1st N.M. in S. year		12·05
	52 years ...	·45	24·24
		Feb. 21·54	36·29
			— 29·53
			6·76
Mean ending moment of 3rd tithi	9·71	Add 3 tithis	2·95
		Feb. 31·25 = Mar. 2.	9·71

March 2, 2449 B.C. was the day on which the 3rd tithi came to an end. The sun's longitude on the day in question being nearly 10 degrees, the moon's longitude at the mean ending moment of the tithi must have been $10 + 3 \times 12 = 46°$. De Mailla's longitude for the moon is 42°, which must have been attained about 6 to 8 hours on either side of the end of the 3rd mean tithi. We see therefore that the date which De Mailla had in mind must have been 2 March, 2449 B.C. There is also probably an error of 10° in his position for Saturn. None of the planets was in the constellation Pisces but all were in Rishabha, a part of which probably corresponds to the Chinese constellation Shi (= Indian Kṛittika).

306. For another example of planetary conjunctions we select the following from CHAMBERS' *Sun, Planets and Comets*:—

"On September 15, A.D. 1186, Mercury, Venus, Mars, Jupiter and Saturn were in conjunction between the Wheat-ear of Virgo (Spica Virginis) and Libra."

Here is an unmistakable reference to a constellation (not a tropical sign) of the zodiac and we ought to be able to verify it easily. The 15 September A.D. 1186 was the 174th day of the Indian solar year A.D. 1186.

We take out the positions of the planets on that day from tables V-A and V-B.

	Mars.	Mercury.	Jupiter.	Venus.	Saturn.
(Table V-A) A.D. 1186 =	A.D. 1912	A.D. 1896	A.D. 1791	A.D. 1899	A.D. 1952
(Table V-B) 174th day	177°	176°	169°	170°	174°

The planets were, we find, comprised within an arc of 8 degrees in the constellation Kanyā or Virgo. In this position, however, they were not visible to the naked eye since the longitude of the sun was 167°. The 14 September 1186 was, as we may see from the Ephemeris for that date (Vol. III of the present work), a day of new moon, and on the 29th of that month there was a lunar eclipse. We know also from the *Encyclopædia Britannica* (11th edition, Volume 2, page 799) that the end of the world was imminently expected in 1186 A.D., and predicted by astrologers all over Europe, apparently on account of this extraordinary conjunction, the like of which perhaps has not occurred since man began to observe the stars.

307. Mention of the year A.D. 1186 leads us to another conjunction of the same kind which must have happened in 2588 B.C., on the 175th day of the Indian solar year (about 14th August). There is no record of this conjunction

anywhere; but that it must have occurred on the date in question may be inferred from Table V-A and Table V-B. In fact after 3,773 years (a compound of 2,005 and 1,768 years) the mean longitudes of Mars, Jupiter and Saturn must according to Table V-A, increase by 11, 20 and 22 degrees, respectively. The reader should find no difficulty in making the necessary calculations.

	Mars.	Mercury.	Jupiter.	Venus.	Saturn.	Sun.
	4277 yrs.	4306 yrs.	4318 yrs.	4270 yrs.	4272 yrs.	(Table
	— 2587	— 2587	— 2587	— 2587	— 2587	IV-C.)
	A.D. 1690	A.D. 1719	A.D. 1731	A.D. 1683 + 285 = A.D. 1918	A.D. 1685	
175th day, 2588 B.C.	172°	160°	154°	155°	155°	167°

The sun was 13° to the east of Jupiter, Venus and Saturn and these planets must have been visible shortly before sunrise. The moon was in a different constellation. With these positions we may compare the places of the five planets on 30th Oct. A.D. 1921 (the current year) which was also a day of new moon, or better still, one week earlier on 23 Oct. A.D. 1921 when Jupiter, Saturn and Venus were in close proximity to each other and Mars only 10 degrees off.

308. The reader will find it a useful exercise to verify the following conjunctions, also extracted from CHAMBERS' *Sun, Planets and Comets*:—

"On November 11, A.D. 1544, Venus, Jupiter, Mars and Saturn were very close, and Mercury was only 16° distant . . . On 11 November A.D. 1544, Venus, Jupiter, Mercury and Saturn were enclosed in a space of 10°. . . On March 17, A.D. 1725, Venus, Jupiter, Mars and Mercury appeared together in the same field of the telescope . . . On December 23, A.D. 1769, Venus, Jupiter and Mars were very close. On October 3, A.D. 1801, Venus, Jupiter and Moon were very close in Leo and Saturn not far off." (For the last two dates the positions of all 5 planets are given *in situ* in Table V-B.)

309. We will conclude the present subject with an example which has an important bearing on Biblical chronology. We are told in the Encyclopædia Britannica (11th edition, Volume 2, page 888), art. *Bible—New Testament Chronology*, that the astronomer Kepler identified the star of the Magi with a conjunction of the planets Jupiter and Saturn which occurred, in the constellation Pisces in May, October and December of 7 B.C. The same work adds, in a footnote (*ibid.*):—"It is a curious coincidence that a medieval Jew, R. Abarbanel (Abrabanel), records that a conjunction of these particular planets in this particular constellation was to be a sign of Messiah's coming. It is just conceivable that his statement may ultimately depend on some such ancient tradition as may have been known to Chaldaean Magi."

We can, with the help of tables V-A and V-B, trace the successive positions of Jupiter and Saturn which must have occupied in 7 B.C. the same positions as they did in 1809 and 1909 respectively. We may set down the positions in a table as follows:—

Movements of Jupiter and Saturn in 7 B.C. (Indian solar year).

Day of Indian solar year.	Julian date.	Jupiter.	Saturn.	Remarks.
0 Day.	March 14 43	343·4°	350·5°	Jupiter's movements in 7 B.C. were the same within a fraction of a degree as in A.D. 1809, and Saturn's movements the same as in A.D. 1909. Tables V-A and V-B. The cyclic variation in the case of Jupiter was that for 1809 + 6 = 1815 years = 3 cycles of 605 years each. The variation was ∴ 3 × — ·223° = — ·669°. The cyclic variation in the case of Saturn was that corresponding to 1909 + 6 = 1915 = 5 × 383 years, i.e., 5 × — ·095° = — ·475°.
10 ,,	March 24	345·8°	351·8°	
20 ,,	April 8	348·1°	353·0°	
30 ,,	April 18	350·2°	354·2°	
40 ,,	April 23	352·5	355·4	
50 ,,	May 3	354·5	356·4	
60 ,,	May 13	356·4	357·5	Distance between the sun and the planets 300° = 20 hrs. Jupiter and Saturn rise in the east 8 hrs. after sunset.

Day of Indian solar year.	Julian date		Jupiter.	Saturn	Remarks.
70 Day.	May	23	358·1	358·2	Distance between sun and the planets 290°. Jupiter and Saturn rise in the east 7 hrs. after sunset.
80 ,,	June	2	359·5	358·8	
90 ,,	June	12	1·0	359·6	
100 ,,	June	22	1·3	359·7	
110 ,,	July	2	2·8	359·9	
120 ,,	July	12	2·3	0·1	
130 ,,	July	22	2·2	359·8	
140 ,,	August	1	2·1	359·4	
150 ,,	August	11	1·0	358·9	
160 ,,	August	21	0·0	358·2	
170 ,,	August	31	358·6	357·5	
180 ,,	September	10	357·4	356·7	Distance between sun and the planets 180°. Saturn and Jupiter rise in the east about the time of sunset.
190 ,,	September	20	358·7	355·9	
200 ,,	September	30	355·4	355·2	
210 ,,	October	10	353·7	354·3	
220 ,,	October	20	352·8	353·8	Distance between sun and the planets 135°. Saturn and Jupiter rise 9 hrs. before the sun, i.e., at 9 p.m.
230 ,,	October*	30	352·3	353·4	
240 ,,	November	9	350·0	352·8	Both Jupiter and Saturn are stationary for about a month.
250 ,,	November	19	352·1	352·9	
260 ,,	November	29	352·5	852·9	
270 ,,	December	9	853·3	352·9	Saturn still stationary. Distance between sun and the planets 90°. Saturn and Jupiter appear in zenith at sunset.
280 ,,	December	19	354·4	353·6	
290 ,,	December	29	355·6	354·2	At sunset Jupiter and Saturn appear in the western sky.
300 ,,	January	8	357·2	354·8	
310 ,,	January	18	359·0	355·8	
320 ,,	January	28	1·1	356·9	
330 ,,	February	7	3·1	358·0	
340 ,,	February	17	5·4	359·2	Mars on 344th day was in conjunction with Saturn.
350 ,,	February	27	7·6	0·4	
360 ,,	March	9	10·0	1·6	In March 6 B.C. both Jupiter and Saturn had conjunctions with the sun and disappeared and they must have reappeared about 4 April as morning stars in the east.

310. The above table shows that on the 70th solar day (May 23) Jupiter and Saturn were within a degree of each other in the last few degrees of Pisces. On the same day the distance between the sun and Jupiter *cum* Saturn was about 290° and the planets must have risen together in the east about seven hours after sunset. From this time the conjoined planets continued to rise night after night in the east until the 180th day (September 10) when they must have risen in the east just as the sun set in the west. On this date the longitude of Jupiter was 357·4 and of Saturn 356·7 and they must have been very close.

We read in St. Matthew, 2, 1-12. "Now when Jesus was born in Bethlehem of Judea in the days of Herod the King, behold, there came wise men from the east to Jerusalem, saying, Where is he that is born King of the Jews? for we have seen his star *in the east*, and are come to worship him. . . . Then Herod, when he had privily called the wise men, inquired of them diligently *what time* the star appeared . . . When they had heard the king, they departed; and lo, the star which they saw in the east, *went before them and stood over where the young child was. When they saw the star, they rejoiced* with exceeding great joy . . . and when they came into the house, they saw the young child with Mary his Mother, and fell down and worshipped him," etc.

On 9 December 7 B.C., the distance between the sun and Jupiter *cum* Saturn was 90° and the two planets must at sunset have appeared in the zenith of the sky. As after this date they ceased to appear in the eastern sky at night, the conference of the Magi with Herod may have occurred about December 9, and they probably referred to their experience in May of the same year when they said that they had seen the star of the King of the Jews *in the east*.

On the 340th day of the Indian solar year 7 B.C., i.e., about 17 February 6 B.C., there was a further phenomenon, for on that day the longitudes of Mars, Saturn and Jupiter were 359·4°, 359·2° and 5·4°, respectively, so that now Mars and Saturn were in conjunction.

* Dr. Neugebauer (*op. cit.* page 95 *ante*) has calculated very accurately, according to modern astronomy, the geocentric longitudes of Jupiter and Saturn for Memphis (6 p.m.) on October 27, 7 B.C. His longitudes are, Jupiter, 345·16° and Saturn 345·77°. If to these figures we add the Indian precession for 589 years (page 94 ante), i.e., 8·5°, we get 353·66° for Jupiter and 354·27° for Saturn.

The Scripture narrative refers to a temporary disappearance of the star and to its reappearance at Bethlehem. We find from the table of movements that between the 0 and the 15th day of the Indian solar year 6 B.C., i.e., between March 14 and March 29 of that year, first Saturn and then Jupiter must have had a conjunction with the sun, that is, they temporarily disappeared, and about April 4, they were to the west of the sun, and they must have appeared low in the western sky, immediately after sunset. This may have been the reappearance at which the Magi rejoiced. Or the expression "the star *stood* over where the child was" may refer to the fact that Saturn became stationary for about two months from October 20, 7 B.C. till December 19 of the same year and that during the same period Jupiter came closer and closer to Saturn until they were again together on December 29. The appearance of the two planets blazing from the zenith after sunset on December 9 must have been a striking phenomenon, at which the Magi could well have wondered as the star "stood" (i.e., was stationary in the zenith for several days) "over where the child was." December 25 is the traditional day when Christ was born.

Kepler, from a study of these phenomena in the light of the tradition recorded by Abrabanel, came to the conclusion that Christ was probably born in 7 B.C. during a conjunction of Saturn and Jupiter. It is now well known that the chronology of St. Dionysins Exiguus who identified what we now call 1 B.C. (= the year 753 A.U.C. or of the Foundation of Rome) with the year of the birth of the Christ was wrong by at least three or four years, and that Christ must have been born before the year now spoken of as 4 B.C. (A U.C. 750).

311. Before concluding this chapter, it may be useful to indicate, for the benefit of other investigators, an important application, and one that is by no means self-evident, of the principle of cyclic recurrence in the positions of planets. In order to obtain the positions of planets in the current cycle, as is done in table V-B, for 363 years (Mars), 355 years (Mercury), 344 years (Jupiter), 235 years (Venus), and 383 years (Saturn), it is not necessary to calculate the positions of these planets for all these years. If we have the calculated positions of Mars for a series of 126 years, in all, say from A.D. 1822 to A.D. 1947, of Mercury for 79 years (say, from A.D. 1855 to A.D. 1933), of Jupiter for 95 years (say, from A.D. 1818 to A.D. 1912), of Venus for 48 years (see paragraph 313 below) and of Saturn for 88 years (say, from A.D. 1842 to A.D. 1929), we have sufficient material for fixing the positions of these planets in the first place for 363, 355, 344, 235 and 383 years, respectively, and secondly through tables V-A and V-B for all the time comprised in the range of history and tradition. The procedure is as follows.

312. Let us assume that we have the calculated positions of Mars for every tenth day in every year from A.D. 1822 to A.D. 1917. With the help of the positions in the first and last of these years as well as of the positions in two intermediate years 1869 and 1909, we obtain the positions in six other years as below :—

0 DAY.			0 DAY.		
Position in A.D. 1947 *minus* ·1 degree = position in 1584 A.D.	...	337·6°	Position in A.D. 1869 *minus* ·1 degree = position in A.D. 1506	..	115·2°
1663	... 338·3°		1585	116·5°	
1742	... 339·1°		1664	117·9°	
1821	... 339·8°		1743	119·2°	
1900	...	... 340·6°	1822	...	120·5°
		4) 3·0°			4) 5·3°
		0·75°			1·3°

We know that Mars' position on 0 day in A.D. 1584 must have been the same as his position 363 years later, i.e., on 0 day in A.D. 1947, less ·1 degree. We therefore write down as Mars' position in A.D. 1584, the position we have already calculated for 0 day in A.D. 1947, less ·1 degree, i.e., 337·6 degrees.

Similarly we write down as Mars' position on 0 day in A.D. 1506, his ascertained position on 0 day in A.D. 1869 less ·1 degree, i.e., 115·2 degrees.

Between A.D. 1584 and A.D. 1900 there are 316 years or 4 periods of 79 years each. We know from the table of Mars' cycles that in 79 years Mars' mean

longitude increases by + 1·015 degree. Our difficulty is, that owing to the annual equation and the anomaly, the actual geocentric place of Mars after 79 years may not increase by exactly + 1·015 degree, but by something more or something less. But for small increases of mean longitude the annual equation and the anomaly will operate uniformly, and we may assume, without risk of error, that if Mars' position on 0 day in A.D. 1584 was 337·6° and if his position on 0 day in A.D. 1900, was 340·6 degrees, his three intermediate stages, viz., those on 0 day in A.D. 1663, in A.D. 1742, and in A.D. 1821 may be obtained by applying a uniform increment of $\frac{3.0}{4} = 0{\cdot}75$ degree. We obtain in this way the actual geocentric place of Mars on 0 day in the years A.D. 1663 (338·3°), 1742 A.D. (339·1°) and 1821 A.D. (339·8°), and we may, if we please, verify these figures by direct calculation.

It is obvious that for every ascertained position of Mars between A.D. 1822 and A.D. 1900, we shall be able to obtain his positions in three other years, in other words, by means of his ascertained positions in the 79 years A.D. 1822 to A.D. 1900, we shall be able to obtain the positions in 3 × 79 = 237 years; and since we have already ascertained the positions of Mars for 126 years, A.D. 1822 to A.D. 1947, we shall have on the whole the positions for 237 + 126 = 363 years, the full number of years required for a Mars' cycle of 363 years.

313. The following table shows at a glance how cycles of 355, 344 and 383 years may be obtained for Mercury, Jupiter and Saturn respectively by following the method we have already indicated for Mars. (The figures refer of course to A.D. years) :—

Mars.		Mercury.		Jupiter.		Saturn.	
1947 = 1584	1869 = 1506	**1933** = 1578	1888 = 1533	**1912** = 1568	1830 = 1486	**1929** = 1546	1871 = 1488
1663	1585	1624	1579	1651	1569	1605	1547
1742	1664	1670	1625	1734	1652	1664	1606
1821	1743	1716	1661	1817	1735	1723	1665
1900	**1822**	1762	1717	1900	**1818**	1782	1724
		1808	1763			1841	1783
		1854	1809			1900	**1842**
		1900	**1855**				

The figures in heavy type are those indicated in paragraph 311 *supra*.

By means of the positions of Mercury, ascertained for the 46 years A.D. 1855 to A.D. 1900, we obtain positions for 46 × 6 = 276 years in addition to the ascertained positions for 79 years ; total 355 years, which is Mercury's cycle.

By means of the positions of Jupiter, ascertained for the 83 years A.D. 1818 to A.D. 1900, we obtain positions for 83 × 3 = 249 years in addition to the ascertained positions for 95 years ; total 344 years, which is Jupiter's cycle.

By means of the positions of Saturn, ascertained for the 59 years A.D. 1842 to A.D. 1900, we obtain positions for 59 × 5 = 295 years in addition to the ascertained positions for 88 years ; total 383 years, which is Saturn's cycle.

314. For obtaining the figures for a Venus' cycle of 235 years we proceed by a slightly different method. We first of all calculate the positions of Venus for 48 years as follows :—

I	II	III	IV	V	VI	VII	VIII
1800	1801	1802	1803	1804	1805	1806	1807
1840	1841	1842	1843	1844	1845	1846	1847
1880	1881	1882	1883	1884	1885	1886	1887
1920	1921	1922	1923	1924	1925	1926	1927
1960	1961	1962	1963	1964	1965	1966	1967
2000	2001	2002	2003	2004	2005	2006	2007

To these six rows of eight figures each we can, without calculation, add a seventh row—

VI	VII	VIII	I	II	III	IV	V
2040	2041	2042	2035	2036	2037	2038	2039

For, the position of Venus in A.D. 2040 is the same as its position 235 years before, in 1805, which stands at the head of column VI. We therefore repeat for A.D. 2040 the figure already obtained for 1805. Similarly we repeat for 2041......2039 the figures already obtained for 1806 . . . . 1804.

315. (Venus—*contd.*) We next proceed to interpolate between 1800 and 2040 the figures for every eighth year as we did before for the other planets. Thus, supposing we want the figure for 0 day in each case we interpolate as follows :—

		O DAY.	
0	... ...	329·3	(ascertained figure).
8	...	329·8	
16	...	330·4	
24	...	331·0	
32	...	331·6	
40	... ...	332·2	(ascertained figure).
		2·9 ÷ 5 = ·6	
48	...	332·7	
56	...	333·2	
64	...	333·7	
72	...	334·2	
80	... ...	334·7	(ascertained figure).
		2·5 ÷ 5 = ·5.	

		O DAY.	
1888	...	335·4	(ascertained figure).
1896	...	336·1	
1904	...	336·8	
1912	...	337·5	
1920	... ...	338·2	(ascertained figu
		3·5 ÷ 5 = ·7	
2000	... ...	344·0	(ascertained figu
2008	...	344·5	
2016	...	345·0	
2024	...	345·6	
2032	...	346·1	
2040	...	346·6	(figure ascertai for A.D. 1805)
		2·6 ÷ 5 = ·52.	

From every year for which we possess ascertained figures we are thus able to obtain figures for four more years; out of 48 years' figures we can thus evolve figures for 192 years in addition to the original 48; total 240 years, which is five years more than the full Venus' cycle of 235 years.

316. The increase of mean longitude of Venus every 8 years is 1·52 degrees, and we could have interpolated all the figures between A.D. 1800 and A.D. 2040 in one series of thirty steps, thus

		O DAY.	
A.D. 1800	... ...	329·3	(ascertained figure).
1808	... ...	329·9	
1816	... ...	330·5	
1824	... ...	331·0	
1832	... ...	331·6	
1840	.. ..	332·2	
1848	... .	332·7	
...	.. ..	...	...
A.D. 2040	.. ..	346·6	(figure ascertained for 1805)
		30)17·3	
		·57	

We see that the figures obtained in the last paragraph for

A.D. 1808	1816	1824	1832	1840	1848
are 329·9	330·5	331·0	331·6	332·2	332·7
against 329·8	330·4	331·0	331·6	332·2	332·7

which we obtained in paragraph 315 and the differences are hardly perceptible; nevertheless it is safe to proceed by breaking the thirty steps into a number of stages as we did in paragraph 315 because the successive differences in the anomaly and annual equation of the thirty steps caused by differences in mean longitude amounting in all to 17·3 degrees may not be uniform in the case of Venus.

317. In the following table, in which the base year is A.D. 1999, the above method of development of a perpetual planetary ephemeris from day today is illustrated in greater detail. The figures for the top and bottom line in the case of each planet being known, the examples show how the figures for intermediate years may be obtained by interpolation. If this table is extended to 79 years in the case of Mars, taking 1998, 1997 . . . 1921 as the successive base-years, to 46 years in the case of Mercury, to 83 years in the case of Jupiter, to 48 years in the case of Venus, and 59 years in the case of Saturn, we shall have all the material required for a perpetual planatery almanac (Tables V-A and V-B). Considerations of space alone forbid the reproduction of these tables, which have the merit of yielding certain important corollaries, one of which (viz., that Mars cannot retrograde in Maghā nakshatra in Kārttika-Margaśīrsha months) is made use of in paper No. V in the appendix *On the astronomical references in the Mahābhārata.*

Table illustrating the process of obtaining, from the calculated places of Mars, Mercury, Jupiter, Venus of 363, 355, 344, 248 and 383 years, respectively

Days of solar year	A.D.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
		Degrees of longitude.															
Mars	A.D. 1967=1684	180·0	176·5	173·5	171·7	171·2	172·1	174·1	177·1	180·5	184·8	189·6	194·7	200·4	206·2	212·3	218·7
	1683	182·4	178·9	175·8	173 9	173·0	173·6	175·6	178·4	181·8	186·0	190·7	195·7	201·5	207·3	213·2	219·6
	1762	184 8	181·4	178 1	176·1	175·0	175·4	177·1	179·7	183·0	187·1	191·8	196·7	202·5	208·3	214·1	220·5
	1841	187·2	183·9	180·4	178·3	177·0	177·2	178·6	181·0	184·3	188·3	192·9	197·7	203·5	209·3	215·0	221·4
	1920	189 6	186·4	182·7	180·5	179·0	179·0	180·1	182·3	185·6	189·5	194 0	198·7	204·5	210·3	215·9	222·3
	1999	192·1	188·9	185·2	182·7	181·1	180·8	181·7	183·8	186·9	190·7	194·9	199·8	205·2	211·0	216·9	223·2
Δ or variation from cycle to cycle.		+2·4	+2·5	+2·3	+2·2	+2·0	+1·8	+1·5	+1·3	+1·3	+1·2	+1·1	+1·0	+1·0	+1·0	+0·9	+0·9
Mercury	A.D. 1986=1631	332·8	345·5	2·3	20·6	39·7	58·6	75·9	90·8	100·5	100·1	92·8	91·0	98·8	112·1	128·7	146·3
	1677	332·8	345·3	2 1	20·4	39·4	58·4	75·7	90·7	100·6	100·7	93·4	91·2	98·8	111·9	128·5	146·0
	1723	332·8	345·2	1·8	20·1	39·1	58·1	75·5	90·6	100·7	101·2	94·1	91·5	98·7	111·8	128·2	145·7
	1769	332·8	345·1	1·5	19·8	38·8	57·8	75·3	90·5	100·8	101·7	94 7	91·8	98·6	111·6	127·9	145·5
	1815	332·8	345·0	1·3	19·6	38·5	57·5	75·1	90·4	100·9	102·2	95·4	92·1	98·6	111·5	127·7	145·2
	1861	332 7	344·9	1·1	19·3	38·2	57·2	74 9	90·3	101·0	102·7	96·0	92·4	98·5	111·3	127·5	145 0
	1907	332·7	344·8	0·9	19·1	37·9	56·9	74·7	90 2	101·1	103·2	96·7	92·7	98·5	111·2	127·3	144·7
	1953	332·7	344·7	0·6	18·8	37·6	56·6	74.5	90 1	101·2	103·7	97·3	92·9	98 4	111·0	127·0	144·5
	1999	332·7	344·5	0·4	18 6	37·3	56·4	74·2	89 9	101·3	104·2	97·9	93·2	98 4	110·9	126·8	144·2
Δ or variation from cycle to cycle.		+0·0	+0·1	+0·2	+0·2	+0.3	+0·3	+0·2	+0·2	−0·1	−0·5	−0·6	−0·3	+0·1	+0·1	+0 2	+0·2
Jupiter	A.D. 1999=1655	349·1	351·5	353·8	356·2	358·4	0·5	2·6	4·4	6·0	7·4	8·5	9·3	9·7	10·0	9·7	9·2
	1738	348·6	351·0	353·8	355·6	357·7	359·9	2·1	3·8	5·3	6 8	7·8	8·6	8·8	9·1	8·7	8·3
	1821	347·5	349·9	352 2	354·5	356·6	358·8	0·9	2·6	4·1	5 5	6·5	7·3	7·5	7·7	7·3	6·8
	1904	346·4	348·8	351·1	353·4	355·5	357·7	359·7	1·4	2·9	4·2	5·2	6·0	6·2	6·3	5·9	5·3
	1987	345·3	347·7	350·0	352·3	354·4	346·6	358·5	0·2	1·7	2·9	3 9	4·7	4 9	4 9	4·5	3·8
Δ or variation from cycle to cycle.		1·1	1·1	1·1	1·1	1·1	1·1	1·2	1·2	1·2	1·3	1·3	1·3	1·3	1·4	1·4	1·5

N.B.—For the top line, **A.D.** 1655, the figures for **A.D.** 1999 have been repeated: but as the cyclic variation between **A.D.** 1999 and **A.D.** of the difference between **A.D.** 1655 and **A.D.** 1987 by 4, that the figure for Jupiter for **A.D.** 1655 is in excess of the figure for **A.D.** 1999 (344 years column the figure for **A.D.** 1987 is 345·3 and that for **A.D.** 1999 is 349 1, a difference of 3 8. We add ·6 to 3·8 in order to get an exact quotient (1·1)

Days of solar year	A.D.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Venus	A.D. 1999	38·0	49·0	61 2	72·1	83·0	93·4	103·3	102·5	120·5	126·6	130·6	131·0	127·5	121·2	115 7	113·8
	2007=1772	38·5	49·9	61·6	72·5	83·3	93 4	103·1	112·1	119·6	125·1	128 1	127·5	123·5	117·5	113 0	112·0
	2015=1780	39·0	50·4	62·0	72·8	83·5	93·5	103·0	111·6	118·8	123·7	125·7	124·1	119·5	113·9	110·2	110·3
	2023=1788	39·5	50·9	62·4	73·1	83·7	93 6	102·9	111·1	117·9	122·3	123·2	120·7	115·5	110·2	107 4	108·5
	2031=1796	40·0	51·4	62·8	73 4	83·9	93·7	102·8	110·6	117·1	120·8	120 8	117·3	111·5	106·5	104·6	106·7
	2039=1804	40·5	51·9	63·2	73·7	84·1	93·8	102·7	110·1	116·2	119·3	118·3	113·9	107·5	102·8	101·8	105·0
Δ or variation from cycle to cycle.		+0·5	+0·5	+0·4	+0·3	+0 2	+0·1	−0·1	−0·5	−0·8	−1·5	−2·4	−3·4	−4·0	−3·7	−2 8	−1·8
Saturn	A.D. 1969=1586	3·4	4·7	6·0	7·3	8·5	9·7	10·9	11·8	12·7	13·7	14·1	14·5	15·0	14·9	14·9	14·6
	1645	4·3	5·6	6·9	8·2	9·4	10·6	11·8	12·7	13·6	14·6	15·1	15.5	16·0	15·9	15 8	15·7
	1704	5·2	6·5	7·8	9·1	10 3	11·5	12·8	13·7	14·6	15·6	16·1	16·6	17·1	17·0	16·9	16·8
	1763	6·1	7·4	8·7	10·0	11·2	12·5	13·7	14·6	15·6	16·6	17·1	17·6	18 1	18·1	18·0	17·9
	1822	7·0	8·3	9·6	10 9	12·1	13·4	14·7	15·6	16·6	17·6	18·1	18·7	19·2	19·2	19·1	19·0
	1881	7·9	9·2	10·5	11·8	13·0	14·3	15·6	16·6	17·6	18·6	19·1	19·7	20·3	20·3	20·2	20·1
	1940	8 8	10·1	11·4	12·7	14·0	15·3	16·6	17·6	18·6	19·6	20·2	20·8	21·4	21·4	21·3	21·3
	1999	9·8	11·1	12·4	13·7	15·0	16·3	17·6	18·6	19·6	20·6	21·2	21·8	22·4	22·4	22·3	22·3
Δ or variation from cycle to cycle.		+0·9	+0·9	+0·9	+0·8	+0 9	+0·9	+0·9	+1·0	+1·0	+1·0	+1·0	+1·0	+1·1	+1·1	+1·0	+1·0

and Saturn, for 126, 79, 95, 48 and 88 years, respectively, the actual places of the same planets for cycles (see paragraph 311, page 127 of text).

Degrees of longitude.

160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360
225·2	232·1	239·1	246·2	253·3	260·6	268·0	275·8	283·2	290·9	298·7	306·3	314·1	321·8	329·5	336·9	344·6	352·2	359·7	7·0	14·4
226·1	232·9	239·9	247·0	254·1	261·4	268·8	276·6	284·0	291·7	299·5	307·1	314·9	322·6	330·2	337·7	345·5	352·9	0·4	7·6	15·0
227·0	233·7	240·7	247·8	254·9	262·2	269·6	277·4	284·8	292·5	300·3	307·9	315·7	323·4	330·9	338·5	346·2	353·6	1·1	8·2	15·6
227·9	234·5	241·5	248·6	255·7	263·0	270·4	278·2	285·6	293·3	301·1	308·7	316·5	324·2	331·6	339·3	346·9	351·3	1·8	8·8	16·0
228·8	235·3	242·3	249·4	256·5	263·8	271·2	279·0	286·4	294·1	301·9	309·5	317·3	325·0	332·3	340·1	347·6	355·0	2·5	9·4	16·8
229·7	236·2	243·3	250·4	257·5	264·9	272·3	279·8	287·5	295·1	302·7	310·3	318·8	325·7	333·1	340·8	348·2	355·7	3·0	10·2	17·5
+0·9	+0·8	+0·8	+0·8	+0·8	+0·8	+0·8	+0·8	+0·8	+0·8	+0·8	+0·8	+0·8	+0·8	+0·7	+0·8	+0·7	+0·7	+0·7	+0·6	+0·6
164·3	181·5	196·9	208·7	213·0	208·1	201·6	203·4	213·8	228·4	244·1	262·8	280·0	296·6	310·3	318·9	317·9	311·4	309·2	317·4	331·0
164·0	181·3	196·8	208·7	213·2	208·7	202·1	203·5	213·6	228·2	244·0	262·5	279·8	296·4	310·2	319·1	318·3	311·8	309·5	317·3	330·8
163·7	181·0	196·6	208·7	213·5	209·3	202·5	203·7	213·5	228·0	243·9	262·2	279·6	296·2	310·1	319·2	318·8	312·3	309·7	317·2	330·7
163·4	180·8	196·4	208·6	213·7	209·9	202·9	203·8	213·4	227·8	243·8	261·9	279·4	296·0	310·0	319·3	319·3	312·7	309·9	317·1	330·5
163·2	180·6	196·2	208·6	214·0	210·5	203·4	204·0	213·3	227·6	243·7	261·6	279·2	295·8	309·9	319·4	319·8	313·2	310·1	317·0	330·4
162·9	180·4	196·0	208·6	214·2	211·1	203·8	204·1	213·2	227·4	243·6	261·3	279·0	295·6	309·8	319·5	320·3	313·6	310·3	316·9	330·2
162·6	180·2	195·8	208·5	214·5	211·6	204·2	204·3	213·1	227·2	243·5	261·0	278·8	295·4	309·7	319·6	320·8	314·1	310·5	316·8	330·1
162·3	180·0	195·6	208·5	214·7	212·1	204·6	204·1	213·0	227·0	243·4	260·7	278·6	295·2	309·6	319·7	321·3	314·5	310·7	316·7	329·9
162·1	179·7	195·5	208·5	215·0	212·6	204·9	204·6	212·9	226·9	243·2	260·4	278·8	295·0	309·6	319·8	321·8	315·0	310·9	316·7	329·8
+0·3	+0·2	+0·2	+0·0	−0·2	−0·5	−0·3	−0·2	+0·1	+0·2	+0·2	+0·3	+0·3	+0·2	+0·1	−0·1	−0·5	−0·5	−0·3	+0·1	+0·1
8·4	7·2	5·9	4·5	3·2	1·8	0·7	0·0	359·4	359·1	359·4	359·9	0·7	1·9	3·3	4·9	6·6	8·7	10·9	13·0	15·4
7·8	6·2	5·0	3·6	2·3	0·7	359·7	359·1	358·4	358·4	358·5	359·1	359·9	1·1	2·6	4·4	6·1	8·1	10·2	12·6	14·9
5·8	4·6	3·4	2·0	0·7	359·2	358·2	357·6	357·0	357·0	357·2	357,8	358·7	359·9	1·4	3·2	5·0	7·0	9·1	11·5	13·8
4·3	3·0	1·8	0·4	359·1	357·7	356·7	356·1	355·6	355·6	355·9	356·5	357·5	358·7	0·2	2·0	3·9	5·9	8·0	10·4	12·7
2·8	1·4	0·2	358·8	357·5	356·2	355·2	354·6	354·2	354·2	354·6	355·2	356·3	357·5	359·0	0·8	2·8	4·8	6·9	9·3	11·6
1·5	1·6	1·6	1·6	1·6	1·5	1·5	1·5	1·4	1·4	1·3	1·3	1·2	1·2	1·2	1·2	1·1	1·1	1·1	1·1	1·1

1655 is + 48, and the variation in geocentric place corresponding to this is found by trial to be from ·4 to ·7, it is assumed, in order to facilitate the division later) by ·4, ·5, ·6 or ·7 degree according as one of these figures is required to make a complete division of the difference by 4. Example: In the **O** day on division by 4, and assume that the cyclic variation for geocentric place between **A.D.** 1655 and **A.D.** 1999 is + 0·6 in favour of the former year.

160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360
116·0	121·1	128·5	137·2	146·8	157·1	168·0	176·2	190·6	202.5	214·4	226·4	238.7	251·0	263·3	275·6	288·0	300·4	312·9	325·2	337·7
115·0	120·0	128·2	137·2	147·2	157·3	168·5	179·6	191·1	203·1	215·0	226·9	239·3	251·7	264·0	276·3	288·6	301·1	313·6	325·9	338·4
113·9	120·0	128·0	137·1	147·5	157·6	169·1	180·0	191·6	203·6	215·5	227·5	239·9	252·3	264·6	276·9	289·3	301·7	314·2	326·6	339·0
112·9	119·4	127·8	137·1	147·9	157·9	169·7	180·4	192·1	204·1	216·1	228·1	240·5	252·9	265·3	277·6	290·0	302·4	314·9	327·3	339·7
111·8	118·9	127·6	137·0	148·2	158·2	170·3	180·8	192·6	204·6	216·7	228·7	241·4	253·6	265·9	278·2	290·7	303·0	315·5	328·0	340·3
110·7	118·4	127·4	137·1	148·5	158·5	170·9	181·2	193·1	205·1	217·2	229·3	241·7	254·2	266·5	278·9	291·4	303·7	316·2	328·7	341·0
−1·0	−0·5	−0·2	−0·0	+0·3	+0·3	+0·6	+0·4	+0·5	+0·5	+0·6	+0·6	+0·6	+·06	+0·6	+0·6	+0·6	+0·6	+0·6	+0·7	+0·7
14·0	13·4	12·7	11·9	11·1	10·2	9·5	8·8	8·1	7·9	7·7	7·4	7·8	8·2	8·5	9·4	10·3	11·1	12·3	13·5	14·7
15·1	14·5	13·8	13·0	12·2	11·3	10·6	9·9	9·2	9·0	8·7	8·4	8·8	9·2	9·5	10·4	11·2	12·0	13·2	14·4	15·6
16·2	15·7	15·0	14·2	13·4	12·5	11·8	11·1	10·4	10·1	9·8	9·5	9·8	10·2	10·5	11·4	12·2	13·0	14·2	15·4	16·6
17·4	16·8	16·1	15·3	14·5	13·6	12·9	12·2	11·5	11·2	10·9	10·6	10·9	11·2	11·5	12·4	13·2	14·0	15·1	16·3	17·5
18·5	18·0	17·3	16·5	15·7	14·8	14·1	13·4	12·7	12·3	12·0	11·7	12·0	12·2	12·5	13·4	14·2	14·9	16·1	17·2	18·4
19·6	19·1	18·5	17·7	16·9	16·0	15·3	14·6	13·8	13·4	13·1	12·8	13·0	13·2	13·5	14·4	15·2	15·9	17·0	18·1	19·3
20·8	20·3	19·7	18·9	18·1	17·2	16·5	15·8	15·0	14·6	14·2	13·9	14·1	14·3	14·6	15·4	16·2	16·9	18·0	19·1	20·3
21·8	21·3	20·7	19·9	19·1	18·2	17·5	16·8	16·0	15·6	15·2	14·9	15·1	15·3	15·6	16·4	17·2	17·9	19·0	20·1	21·3
+1·1	+1·1	+1·1	+1·1	+1·1	+1·1	+1·1	+1·1	+1·1	+1·1	+1·1	+1·1	+1·1	+1·0	+1·0	+1·0	+1·0	+1·0	+1·0	+0·9	+0·9

SECTION iv.—*The Planetary Eye-tables.*

318. The planetary eye-tables for Mars, Mercury, Jupiter, Venus and Saturn, which are included in Table IV, constitute an important by-product of the perpetual planetary almanac. The general nature and use of the planetary eye-tables has been referred to in paragraph 225 supra (page 93) and it only remains to explain how the eye-tables were constructed. The object is to ascertain for each mean longitude of a planet, whether superior or inferior, say for 0°, 10°, 20°, . . . 350° of its mean longitude, the corresponding actual geocentric place attainable by it on each day of the Indian solar year, say on 0 day, on the 10th complete day . . . on the 360th complete day and *vice versa*. Supposing we wished to have such an eye-table in 36 stages, for each planet, and for every ten complete days of the Indian solar year (like the eye-tables we actually possess in Table IV), it would be theoretically necessary to compute, in the manner shown in paragraphs 237 and 239 supra (pages 96, 97), the actual geocentric places corresponding to $5 \times 36 \times 36 = 6{,}480$ mean positions, which might take a whole year or more to compute.

319. As an alternative to this formidable undertaking, we simply note, in the perpetual planetary almanac (Table V-B), the occasions on which 0°, 10°, 20° . . . 350° are attained as geocentric places, on the 0 day of the solar year, first by Mars, then by Jupiter, and thirdly by Saturn; then, the occasions on which 0°, 10°, 20°, etc., are attained as geocentric places by the same planets on the 10th complete day of any solar year; and so on up to 360 complete days of the solar year. Having secured these occurrences, we tabulate them, and add to each geocentric place the corresponding mean longitude, which is easily done with the help of Table V-A. The result is the eye-table for each of the superior planets Mars, Jupiter and Saturn.

320. For the *inferior* planets Venus and Mercury, we first of all tabulate their increases of mean longitude, for every 10 days, for 235 years in the case of Venus, and for 46 years in the case of Mercury. Then we select from Table V-B the actual geocentric places corresponding to definite stages of increase of these mean longitudes. As a result, the eye-table for Venus presents the same general appearance as the eye-table for Mars, Jupiter and Saturn, but whereas the vertical heavy-type column in the eye-tables of Mars, Jupiter and Saturn presents actual geocentric places, and the body of the tables presents mean longitudes, the first vertical column in the eye-table of Venus furnishes *mean* longitudes and the rest of the table presents the geocentric places. This variation in the eye-table for Venus is a necessity, because, to every single mean longitude of Mars, on, say, the 100th day of the Indian solar year, there corresponds but a single geocentric place, and *vice versa*, whereas the *vice versa* does not hold good in the case of Venus: for instance, on the 160th complete day of the Indian solar year, Venus may have a geocentric place of 164° when her mean longitude is 180°, and she will have the same geocentric place also when her mean longitude is 329°.

321. In the case of the Mercury eye-table, there is a further peculiarity. All the possible positions, whether mean or actual, of Mercury on a given day of the Indian solar year are reducible to 46 definite types, exemplified by the years noted in column 1 of Mercury's eye-table and the actual positions in other years do not vary from these excepted to the extent of a degree or two. It was, therefore, thought advisable to retain these types themselves as an eye-table: it thus happens that for every 10th day of the Indian solar year the Mercury eye-table presents 46 stages at intervals of about 8°, instead of 36 stages at intervals of 10° between one stage and the next, as in the case of the other planets.

322. It was stated in paragraph 268 supra (page 107) that the eye-tables can be used for the purpose of computing the actual geocentric places of the five planets in the *Paripādal* horoscope. We may now compare the results of applying to the calculation of this date (1) the rigorous method presented in paragraphs 237, 239 supra (pages 96, 97), (2) Tables V-A and V-B, (3) the planetary eye-tables.

—	Mars	Mercury.	Jupiter	Venus.	Saturn.
Mean longitude on 89th complete day A.D 634, i.e., 17th June, time about mean sunrise.	331·92°	11·56°	330·83°	296·23°	260·41°
(1) Actual geocentric place by strict calculation, paragraphs 287 and 289 (pages 96 and 97)	17·12°	70·4°	340·5°	41·6°	256·4°
(2) Actual geocentric place by Tables V-A and V-B (page 112 supra).	17·5°	70·4°	340·6°	42·8°	256·4°
(3) Actual geocentric place by planetary eye-tables (Table IV).	17·1°	70·4°	341·0°	42·7°	256·0°

It will be seen that, although the planetary eye-tables omit fractions of a degree, yet the results yielded by them are accurate enough for all practical purposes.

323. The eye-tables have, however, one drawback, as compared with tables V-A and V-B. When a planetary eye-table is used, as in the last paragraph, for ascertaining the geocentric place of a planet directly from its mean longitude on a given day of the Indian solar year, proportionate parts will generally have to be taken, and that, more than once in each case. Thus in the case dealt with in the last paragraph, the reader, on looking into the Mars and Mercury eye-tables, will find certain entries under the 80th and 90th completed days, which he should proceed to manipulate as shown below:—

Mars.

Col. 1. Actual geocentric place (Eye-table.)	Col 2 Mean longitude on 80th complete day. (Eye-table)	Col. 3. Mean longitude on 90th complete day (Eye-table.)
10°	325°	324°
20°	338°	335°

By taking proportional parts for the 89th day, we find that Mars, on 89th complete day,

would have attained 10° actual geocentric place for a mean longitude of **324°** ... (1)

and would have attained 20° actual geocentric place for a mean longitude of **335·3°** ...... (2)

By taking proportional parts again with reference to (1) and (2), we see that if Mars on 89th complete day attained, with an increase of 11·3° mean longitude (i.e., 335·3° — 324°), an increase of 10° in actual geocentric place, he would, with an increase of 8° mean longitude, attain an increase of $\frac{8 \times 10}{11 \cdot 3} = 7 \cdot 1°$ in actual geocentric place. In other words, on the 89th complete day Mars' geocentric place, corresponding to mean longitude 332° = 10° + 7·1° or 17·1°, which is exactly the result obtained by strict calculation in accordance with paragraph 239, page 96 supra.

Mercury.

From the following entries in Mercury's Eye-table under 80th and 90th complete days,

80th complete day.		*90th complete day.*		
i.e., mean longitude ...	332°	mean longitude	13°	(1)
actual geocentric place ...	57°	actual geocentric place ...	71°	

we obtain, by proportional parts for 89th complete day,

mean longitude	**9°**	(2)
actual geocentric place . .	**69·8°**	

similarly, from the following entries under 80th and 90th complete days,

80th complete day.		*90th complete day.*		
mean longitude	339°	mean longitude	20°	(3)
actual geocentric place ...	58°	actual place	73°	

we obtain, by proportional parts, for 89 complete days,

mean longitude	**16°**	(4)
actual geocentric place	**71·5°**	

Lastly from (2) and (4) we reason as follows, by proportional parts :—

with an increase of 7° in mean longitude (i.e., 16° — 9°) Mercury attains an increase in geocentric place of 1·7° (i.e., 71·5° — 69·8°).

with an increase of 2·6° in mean longitude (i.e., 11·6° — 9°) Mercury attains an increase in geocentric place of $\frac{2 \cdot 6 \times 1 \cdot 7}{7} = \frac{4 \cdot 42}{7} = \cdot 63°$.

That is, on 89th complete day, Mercury's actual place, corresponding to mean longitude (9° + 2·56°) or 11·56°, = **69·8°** + ·63°= **70·4°**, which is exactly the result obtained by strict calculation in accordance with paragraph 237, page 95, supra.

324. In taking proportional parts for the 89th complete day, the eye-tables for Jupiter and Saturn should be used in the same way as the eye-table for Mars.

325. For Venus, we have, by the Venus Eye-table.

Col. 1. Mean longitude.	Col. 2. Actual geocentric place on 80th complete day.	Col. 3. Actual geocentric place on 90th complete day.	Col. 4. Therefore actual geocentric place on both complete day (by proportional parts).
290°	32°	47°	**45·5°**
300°	31°	42°	**40·9°**

That is, we find, from the first and last columns, that with an increase in mean longitude of 10° (i.e., 290° to 300°), Venus undergoes a decrease in geocentric place of 4·6° (i.e., 45·5° — 40·9°).

Therefore, with an increase in mean longitude of 6° (i.e., 296° — 290°), Venus undergoes a decrease in geocentric place of 6 × ·46°= 2·76°.

In other words, on 89th complete day, Venus' geocentric place, corresponding to a mean longitude of 296·23°, = **45·5°** — 2·76° = **42·7°**, which is within 1 degree of the result obtained by strict calculation in accordance with paragraph 237, page 95, supra.

SECTION V.—*Eclipses and Eclipse chronology.*

326. All over the world, and whatever system of chronology may be followed in any particular country, a recorded eclipse is an unerring landmark for the chronologist, and therefore the energy of mathematicians since the 16th century A.D. has been expended on the production of lists of eclipses for ancient as well as modern times. In such lists the path of each solar eclipse is often noted, showing in what parts of the terrestrial globe it was central and where it was visible. Oppolzer's *Kanon der Finsternisse*, which is generally regarded as a standard work on the subject, describes the eclipses, both lunar and solar, from 1207 B.C. to A.D. 2161 and is fully illustrated with charts. For eclipses comprised within this period, no other guide is necessary, and it happens that the most ancient eclipses recorded anywhere in history fall within this period. Professor Newcomb's *Tables of Solar Eclipses from 700 B.C. to A.D.* 2300, and Dr. Gratton Guinness' very accurate list of lunar eclipses in his *New Moons and Vernal Equinoxes* (B.C. 1622 to A.D. 1934) may also be referred to. Lastly, frequent use has been made in the course of this work of a French work, first published in the 18th century, *L'Art de Vérifier les dates*, which gives all kinds of eclipses in some detail from A.D. 1 to A.D. 2000. The eclipses in Sir A. Cunningham's *Book of Indian Eras* are reproduced from the French work. Italicized solar eclipses in IV-L will generally be found in Oppolzer, but not in the French work. The reason why such eclipses are omitted in the French work is given in paragraph 345 below.

327. But in India public curiosity occasionally fastens itself on eclipses which are more ancient than any recorded in the above works, and which there is no known means of dating, because the literary documents referring to them are themselves destitute of any historical dates. For instance, a solar eclipse is believed to have occurred on the day when Rāma was to have been crowned, and when, instead being of crowned, he went into exile. Bentley referred this eclipse to 940 B.C., July 2. In the Mahābhārata two eclipses, occurring in the course of a fortnight (this is the most sensible construction that can be placed on a passage which literally means that both a lunar and a solar eclipse occurred on the same day, which is physically impossible), are said to have preceded the great battle, and

these eclipses must have occurred, according to the commentators, in the lunar month of Kārttika or Mārgaśīrsha. But there are no dates in either the Rāmāyaṇa or the Mahābhārata, and as there is nothing whereon we can base even an approximation to a date, critics and investigators imagine dates, more or less hypothetical, for the events of the Rāmāyaṇa or for those of the Mahābhārata and seek to establish their hypothesis by showing that there were eclipses on those dates.

328. It is not, however, solely to gratify such speculative curiosity that the following tables have been devised. A recorded eclipse is a genuine and solid landmark in history; but ancient records of eclipses, equally with those of other events, are often not quite exact in detail, and then it is necessary to ascertain by other means whether there was an eclipse on a particular date and what was its nature and extent. An eclipse obeys certain laws of cyclic recurrence, like a tithi or a nakshatra or a planet; and it is the object of this section to define and exemplify the cycles which will be found most useful in practical investigation, and which will enable us to satisfy ourselves whether an eclipse which is believed to have occurred on a certain date did occur, or could have occurred at that time.

329. An eclipse cycle may be defined as a period, composed of a certain number of partial or complete solar years, after which the sun's distance from a node is the same at new moon (in the case of a solar eclipse), or at full moon (in the case of a lunar eclipse), and the sun's and moon's anomalies are also nearly the same, as at the beginning of the period. A *perfect* eclipse cycle in this sense probably does not exist, but there is no harm in using an imperfect cycle, provided we apply from time to time the correction, which we may call the cyclic variation.

330. It was stated in paragraph 140, page 40, supra, that in order that an eclipse may be possible, the sun should be within a certain distance from either of the moon's nodes. For a solar eclipse, it suffices if the sun is between 0° and 16·2° from a node: indeed a solar eclipse is possible so long as the sun is not more than 18·9° from a node. For lunar eclipses, the limits are much narrower: for a lunar eclipse to be fairly certain, the sun must not be more than 10·44° from a node, and when his distance from a node is between 10·44° and 13·86°, a lunar eclipse is possible, not probable. It follows from the tables of Rāhu's (IV-K) and sun's (IV-C) motions, that the distance of the sun from the node diminishes every day at the rate of 1·0386015 degree, and the interval from the moment when the mean sun is at a node to the moment when he is at the same node again is $\frac{360°}{1·0386015} = 346·61996$ days. This is the period of a joint revolution of the sun and node, fixed by modern astronomy; but when using this period in Indian astronomy, we have to make the same allowance for the annual displacement of the 0° point of longitude in Indian astronomy as we did in paragraph 219, page 91, supra, in the case of the planets. Applying the same method to the distance of the sun from the node, or as it is shortly called, "Sun from node," we proceed as follows:—

Sun and node together do $\frac{360°}{346·61996} = 1·0386015$ degrees per day (modern astronomy).

Sun alone does $\frac{360°}{365·25636} = ·9856091212$ degree per sidereal day (modern).

∴ node alone does $1·0386015 - ·9856091 = ·0529924$ degree per day (modern).

And a given node does 360° in $\frac{360°}{·0529924} = 6793·4269$ days $= 18·59906$ sidereal years (modern).

In 18·59906 years, the displacement of sun's 0° longitude (vide paragraph 217, page 90, supra) $= 18·59906 \times ·002361° = ·04391238°$.

But the node travels ·0529924 degree per day in a direction opposite to that of the sun.

∴ it travels ·0439124° in $\frac{·0439124}{·0529924} = ·8286453$ day.

∴ node, by Indian astronomy, must be held to complete an orbit in $6793·4269 - ·8286 = 6792·5983$ days.

∴ node, by Indian astronomy, travels in one day $\frac{360°}{6792·5983} = ·0529988°$.

But the sun, by Indian astronomy (Sūrya Siddhānta), in one day travels ·9856026°.

∴ sun and node, by Indian astronomy, together travel in one day 1·0386014°.

And sun and node travel in 1 year 1·0386014 × 365·25876° = 379·3583°.

∴ Sun and node together travel in 360° in $\frac{360°}{1·0386014}$ = 346·61998337 days.

According to Sūrya siddhānta, the last figure, as observed by Professor Jacobi in *Epig. Ind.*, Vol. I, page 442, ought to be 346·6246334 days: but inasmuch as the only use ordinarily made of the distance of sun from node in chronological investigations is in connexion with eclipses, and eclipses are peculiarly a matter of observation and therefore a matter which, to be safe, should, as far as possible, be regulated by the quantities of modern astronomy, we adopt, for the period of joint revolution of the sun and node, 346·61998337 days which, as compared with the figure adopted in modern astronomy, involves a slight correction for the annual displacement of the sun's 0° longitude in Indian astronomy.

331. The other quantities which we shall make use of in Table IV-L follow from those above settled. The length of a tithi, as a fraction of a day, by Sūrya siddhānta = $\frac{29·530587946}{30}$ = ·9843529315 of a day.

The joint motion of sun and node for one tithi = ·9843529315 × 1·0386014 = 1·022350332̇75 degrees.

∴ The joint motion of sun and node for 360 tithis, or an ordinary lunar year of 12 months = 360 × 1°·0223503327̇5 = (36) 8·046011979 degrees; and the joint motion of sun and node for 390 tithis or 13 lunar months (when the lunar year includes an ādhika month) = 3 (9) 8·716521961°.

N.B.—Tables for readily calculating the distance of sun from node for any number of days or years will be found at the end of this section.

332. We now proceed to define the principal cycles which we shall use in investigating the recurrence of eclipses. The first is the famous saros of 18 years and 10 days, which has been known at any rate in the west from a period of remote antiquity.

(1) (*a*) 18 Indian sidereal years = 6,574·65768 days (Sūrya siddhānta).
(*b*) 223 synodical months = 6,585·321124 days (Sūrya siddhānta).
(*c*) 19 joint revolutions of sun and node = 6,585·779684 days (Ephemeris).

Difference between (*a*) and (*b*) = 10·66344 days.

Difference between (*b*) and (*c*) = − ·45856 of a day, or, at the rate the daily joint motion of the sun and node already arrived at, + ·4762°. In other words, in 18 Indian sidereal years + 10·66344 days, the distance of the sun from node advances by + ·4762°. The reader should reason out for himself why the result is + ·4762° and not − ·4762°.

(2) (*a*) 19 sidereal years (Indian) = 6,939·916364 days.
(*b*) 235 synodical months (Sūrya siddhānta) = 6,939·6881565 days. This is the Metonic cycle, which is as ancient and as interesting as the saros.
(*c*) 20 joint revolutions of sun and node (Ephemeris) ... ... = 6,932·3996674 days.

In 235 synodical months (Sūrya siddhānta) difference between (*b*) and (*c*) . . ... = 7·2884891 days.

In this interval the distance of the sun from the node decreases by 7·2884891 × 1·0386014° = 7·5698349831°.

The Metonic cycle can be applied to eclipses when the sun is very near a node at one of the eclipses compared. For example, on the 87th day of A.D. 1 (Table IV-L, first line) the distance of the sun from node was 3·41°. Nineteen years later, the distance must have decreased by 7·57°, i.e., the distance then was −4·16°, at which distance an eclipse was still probable. We find from Table IV-L that on the 87th completed day of A.D. 20 there was a solar eclipse at which the sun's distance from node was −4·16°.

(3) (*a*) 358 synodical months (Sūrya siddhanta) = 10571·9504682 days.
(*b*) 30½ joint revolutions of sun and node (Ephemeris) ... ... = 10571·909390 days.

(c) 29 Indian sidereal years (Sūrya siddhanta) = 10592·503924 days.
Difference between (a) and (c) ... ... = 20·6 days.
Difference between (a) and (b) ... ... = + ·041 day, or — ·04258°.

This cycle of 29 years *less* 20·6 days is the foundation of the next two cycles.

		Days.
(4) (a)	716 synodical months (Sūrya siddhānta) ...	= 21143·9009364
(b)	61 joint revolutions of sun and node (Ephemeris)	= 21143·818780
(c)	58 Indian sidereal years (Sūrya siddhānta) ...	= 21185·007848
	Difference between (a) and (c)	= 41·107
	Difference between (a) and (b)	= +·082156 day or —·08516°.

This cycle of 58 years, *less* 41·1 days, is the one most frequently used in Table IV-L. (See headlines of Table IV-L.)

		Days.
(5) (a)	521 sidereal years (modern)	= 190298·56356
(b)	521 Julian years (modern and tropical) ...	= 190295·25
(c)	521 sidereal years (Sūrya siddhānta)	= 190299·81396
(d)	6,444 synodical months (Indian or modern) ...	= 190295·109072
(e)	549 joint revolutions of sun and node (Ephemeris)	= 190294·36902

Difference between (d) and (e) = 0·74 day or 0·76444°; difference between (c) and (d) = 4·7 days; and the difference between (b) and (d) = 0·14 day.

(f) In 521 Indian sidereal years, *less* 4·7 days, the moon's anomaly moves 3·1 days. (Eye-table e.)

N.B.—(i) All the quantities in this cycle of 521 Julian years are 18 times those in (3), the cycle of 29 years *less* 20 days, or 9 times those in (4), the cycle of 58 years *less* 41·1 days.

(ii) After 521 Julian years, eclipses recur on the same day of the European calendar (old style). This can be verified by means of Table II. For instance, the solar eclipse on June 9, A.D. 1 is repeated on June 10, A.D. 522. But when one of two eclipses, compared at an interval of 521 years, occurred before 14th September A.D. 1752 (when the new style was introduced into the United Kingdom) and another occurred after the above date, the day of the month will be increased by 10 or 11 days.

333. The cycles of recurrence used in Table IV-L are (1) supra, 18 years *plus* 10·66344 days, and (4) supra, 58 years *less* 41·107 days, and combinations of these, as noted at the top of the several columns in that table. Cycle No. (3) supra, 29 years *less* 20·6 days, is a good cycle for the half joint-revolution of the sun and node, and because an eclipse may occur when the sun is at either node, and at the end of 29 years *less* 20·6 days, the sun is only 0·04 degree nearer to or further from the node than he was at the beginning of this period, it follows that eclipses occur regularly at the end of every 29 years *less* 20 days. It is noted in the *Encyclopædia Britannica* (Art. *Eclipse*) that, "starting from the eclipse of Nineveh, June 15, 763 B.C. we find eclipses on May 27, 734 B.C., May 7, 705 B.C. and so on, in an unbroken series for 2,600 years down to A.D. 1843, A.D. 1872 and A.D. 1901, i.e., once in 29 years *less* 20 days, the last being the 93rd of the series."

334. The disadvantage of cycles of 29 years *less* 20·6 days in chronological investigation is that we have to reckon by half-joint-revolutions of the sun and node. By doubling this cycle to 58 years *less* 41·1 days, we secure the recurrence of meetings of the sun and node in the same degree of longitude.

335. But a pure cycle of 58 years *less* 41·1 days, like a pure saros of 18 years *plus* 10·7 days, has the disadvantage of accumulating, in a long period of time, the small difference in longitude noted above to what may turn out to be a considerable amount. Thus at the end of 9 cycles of 58 years *less* 41·1 days, or 521 Julian years, or 521 Indian sidereal years *less* 4·7 days, the sun will be at the same

distance from the node as at the beginning of this period, *less* 0·76 of a degree. The probability of an eclipse is not much affected by this difference, but after five such periods, the distance is less by 5 × ·76 = 3·8°, and if the distance of the sun from the node was 164° at the beginning of the period, at which distance an eclipse is within the bounds of possibility, it would, at the end of 5 × 521, or 2,605 years, be 164° *less* 3·8° or 160·2°, at which distance an eclipse is impossible.

336. To avoid such accumulation of cyclic differences in a long period of time, and still more to avoid the accumulation of + ·17° for every saros of 18 years, we vary the cycles, as will be seen from the headlines of Table IV-L, in such a way as to prevent any cyclic variation exceeding ·29 of a degree. This is effected by combining the 58 years' cycle occasionally with the saros of 18 years, that is, five times in the course of 1,711 years, after which the distance of the sun from node is exactly what it was at the beginning of the 1,711 years' cycle.

337. For

1,711 Indian sidereal years	=	624957·731516 days (a).
21,163 synodical months (Sūrya siddhānta)	=	624955·833844 days (b).
1,803 joint revolutions of the sun and node	=	624955·829349 days (c).

The remarkable closeness of (b) and (c), the difference between them being only ·0045 of a day, or 39 seconds of time, or ·00467 of a degree, which is only 2 seconds of an arc, makes this cycle a very useful one in chronological investigation. The difference between (a) and (b) is only 1·9 days or just under two days, which means that if we have an eclipse say on the 35th day of the Indian solar year, A.D. 1901, there was probably another eclipse in the year 1901 *less* 1711, or A.D. 190, on the 37th day, and another in A.D. 190 *less* 1711 or — 1521 A.D., i.e., B.C. 1522 (vide remarks on *minus* A.D. years in paragraph 292, page 117 supra), on the 39th day, and another in B.C. (1,522+1,711) or 3,233 B C. on the 41st day. So far as A.D. 190 and A.D. 1901 are concerned, we find this to be the case from Table IV-L (see the line of the eclipses beginning with A.D. 16, 160th day), and we know that the same must have been the case in B.C. 1522, and in B.C. 3233, though we have no records of eclipses going back so far.

338. Let us study an actual example which will illustrate exactly the use we might make of Table IV-L, and of the key prefixed to it. An ancient Babylonian record refers to an eclipse of the sun on 20th June, 1070 B.C. (*Encycl. Brit.*, Art. *Eclipse*), and we wish to verify this. In 1070 B.C. the 20th June was about the 108th day of the Indian solar year (Eye-table **k** and **q**). We know from the 1,711 years' cycle that, if the Babylonian record is correct, then 1,711 years later, i.e., in A.D. 1711—1069 or A.D. 642, there must have been a solar eclipse about the 106th completed day. Now turning to Table IV-L, we find a solar eclipse in A.D. 642, on the 105th complete day. We expected it on the 106th day, but our fixation of 20th June, 1070 B.C. as the 108th completed day of that year was a rough one, arrived at by simply deducting March 4 (Eye-table **k**, 1101 B.C.) from March 112 (the equivalent of June 20, acc. to Eye-table **q**).

339. If we calculated the exact day of the Indian solar year 1070 B.C. which corresponded to June 20, and calculated also the actual ending moment of the new moon tithi in June of 1070 B.C. and in June of A.D. 642, we would have a difference of two whole days only (according to the 1,711 years' cycle) and not of three whole days. This, however, does not vitiate our chronological result, that on 20th June, 1070 B.C. there was probably a solar eclipse, the distance of the sun from the node having then been, as on the 105th day of 642 A.D., 356·83 degrees. We know from the headlines of Table IV-L that in A.D. 642, as compared with A.D. 27, the cyclic variation for the distance of the sun from the node was + ·10 degree, so that since the distance of the sun from the node in A.D. 27 at the first solar eclipse of that year was 356·83 degrees, the distance at the corresponding eclipse of the year A.D. 642 must have been 356·93 degrees, and the distance at the corresponding eclipse of 1070 B.C. must have been also 356·93 degrees, because the cyclic variation in the distance of the sun from the

node for 1,711 years *less* 2 days is only ·004 of a degree. Lastly, if we wish to know the English equivalent of the 105th completed day of A.D. 642 we turn to Table IV-M (Table of equivalence of English and Indian days in the several centuries A.D.), which shows us that in A.D. 642 the 105th completed day of the Indian solar year was either July 3 or July 4. We see that, unlike the 521 years' cycle, the 1,711 years' cycle does not give us an eclipse in the same English month: but it is very convenient for all other purposes in chronological investigation.

340. We shall next study two ancient eclipses of the moon. In Shakespeare's *Hamlet*, Act I, scene i, there is a reference to the fact that "a little ere the mightiest Julius fell," i.e., before 15th March, 44 B.C. the moon "was sick almost to doomsday with eclipse." According to astronomers, there was an eclipse of the moon on 7th November, B.C. 45 visible at Rome two hours after midnight. The 7th November, in B.C. 45 was, by Eye-table **k** and **q**, March 252 *less* 13, i.e., the 239th completed day of the year. On the 237th completed day of A.D. 1711 *minus* 44, or A.D. 1667 we should have, if Shakespeare's reference is historical, a lunar eclipse. The key to Table IV-L shows that eclipses of the year A.D. 1667 follow the same order as eclipses of the year A.D. 14, and against A.D. 14 we find in Table IV-L, a lunar eclipse on the 237th completed day of the year A.D. 1667, just what we expected. The commentators of Shakespeare's *Hamlet* are silent as to the exact authority for his reference to a lunar eclipse in the year B.C. 45. Plutarch, who is Shakespeare's usual source of information in regard to Roman history, mentions portents, not a lunar eclipse as having preceded the assassination of Julius Cæsar. Ovid's *Metamorphoses*, Bk. xv, ll. 787–790 which, in the "Howard" Shakespeare, is cited as an authority, refers to a solar, not a lunar, eclipse. Lucan's *Pharsalia*, Bk. I, ll. 526, etc., refers no doubt to a lunar as well as a solar eclipse, but that was before the battle of Pharsalia, B.C. 48. We have good reason, however as chronologists, for supposing that Shakespeare relied on some authority more specific than Ovid, Lucan or Virgil (*Georg.* I, l. 467). Whatever Shakespeare's source of information was, the lunar eclipse alluded to by him appears to have been a solid historical fact, referrable to a definite date 7th November, 45 B.C.

Plutarch, in his life of Paullus Æmilius (Langhorne's Translation), says that when the Roman army was about to retire to rest on the eve of the battle of Pydna (June 22, B.C. 168) "on a sudden the moon was totally eclipsed." June 21 (the eve of the battle) was, by Eye-table **k** and **q** (March 113 *minus* 12 =) the 101st completed day of the Indian solar year, and about the 99th day of the year A.D. 1544 (i.e., A.D. 1711 *minus* 167) we should find a lunar eclipse, if there was one on 21 June, B.C. 168. On the 99th day of A.D. 1544, we do find a lunar eclipse (see Table IV-L, the line beginning with A.D. 24); and the sun's distance from the node then was $173·57^\circ - ·23^\circ = 173·34^\circ$. In fact there was a lunar eclipse at the end of every cycle in the line beginning with A.D 24, 354th day.

341. The distances of the sun from the node given in the first column of Table IV-L are distances of the *mean* sun: but of course a solar eclipse depends on the distance of the actual sun, for which purpose we want the sun's equation of the centre for the day in question according to Table IV-C. Thus in the example given above (B.C. 1070, June 20) when the distance of the *mean* sun from the node of the 108th completed day of the Indian solar year was 356·93 degrees, the sun's equation of the centre was by Table IV-C, *minus* 1·0009 degree, which of course made the sun, + 1·0009 degree further from the node (because the sun moves in a direction opposite to the node), so that the actual distance of the sun from the node on the 108th completed day of 1070 B.C. was 366·93+1·00=357·93 degrees. This only made a solar eclipse more certain on the 108th day in B.C. 1070 than in A.D. 642 on the 106th day.

For a lunar eclipse also the sun must be at or near a node at the moment of an eclipse when the moon is at the opposite node: here again our tables give us the distance of the *mean* sun from a node and for his actual distance, we want not only his equation of the centre but also the elongation of the sun from the node due to the difference in time between the mean and actual ending moment of the tithi.

342. Thus, the lunar eclipse alluded to in *Hamlet*, took place on the 239th completed day of the Indian solar year 45 B.C., when the distance of the *mean* sun from the node was, by Table IV-L, 178·11 degrees (the entry in column 1 under A.D. 14, 2nd lunar eclipse) *plus* ·07 degrees (entry in the headline above A.D. 1667), or 178·18 degrees. But the interval between the actual and *mean* ending moment of this full moon tithi was as follows :

		☉'s An days	☾'s An. days
Eye-table **k, l, m,** 101 B.C. March	13·16	6·54	24·26
Eye-table **n, o, p,** 56 years.	·49	10·21	8 98
	16·75	16·75	16·75
			49·99
			27·55
			22·44
Mārgaśīra Full Moon Eye-table **y**	221 48	22·148	1·04
March.	251·83	238·23	23·48
☉'s Anomaly for 238·23 d. (Eye-table **h.**) — 08			—·08 (☉'s An.)
			23·40
☾'s Anomaly for 23·40 d. (Eye-table **e.**) +·32			
+·24	+·24		
	March 252·07.		

The actual tithi having occurred + ·24 days later than the mean tithi, the sun was thereby ·24 degree nearer the node, and the sun's equation of the centre for the 238th day being *minus* ·93 degree, he was for this reason ·93 degree further from the node : altogether the sun's distance from the node at the centre of the eclipse was 178·18 *minus* ·24 *plus* ·93 = 178·85 degrees.

The eclipse occurred at ·07 of day, Lanka time on March 252, i.e., on 7th November ; at Rome the corresponding time was 4 hours 16 minutes less, or ·18 of day less than at Lanka ; in other words the time of the eclipse at Rome was ·89 of the day, that is, by Table VI, 21 hours 22 minutes after Lanka sunrise, i.e., 3 hours 22 minutes after mid-night.

The maximum effect of tithi equations being an addition to, or subtraction from, the mean ending moment, of ·58 of a day (paragraph 28, page 8 supra) and the maximum of sun's equation of the centre being 2·14 degrees, it follows that the *actual* sun may, by reason of these equations, be at a given moment nearer to or further from the node than the *mean* sun by 2·72 degrees.

343. The moon's anomaly and the sun's anomaly are therefore important considerations in the investigation of eclipses. In 87 years *less* 62 days [i.e., three times (29 years *less* 20 6 days)] the moon's anomaly, by Eye-table **p** moves only ·52 of a day: consequently, after 87 years *less* 62 days, there will not be much change due to the moon's anomaly in the relative position of the sun with reference to the node; and the *Ency. Brit.* (*loc. cit.*) therefore observes :—" In a series including every third eclipse " (i.e., every eclipse after an interval of 87 years *less* 62 days) " the eclipses will be of the same character through a thousand years or more. Thus the eclipses of A.D. 1467, 1554, 1640, 1727, 1814, 1901, 1988 are total."

344. We may here remind the reader of the observations made in paragraph 137, page 49 supra, regarding the universality of a lunar eclipse, so far as the earth's surface is concerned, and the comparatively circumscribed limits of a solar eclipse. Hence a lunar eclipse is much easier to verify than a solar eclipse. If we know the date of a lunar eclipse according to any good modern authority, we may be sure that, making allowance for terrestrial longitude, the same eclipse must have occurred over every part of the terrestrial globe illuminated by the moon. Thus in investigating the lunar eclipse referred to in the Tamil poem *Paripāḍal* (vide

paragraph 266, page 106 supra), we took the time of occurrence of the eclipse from the French work "*L'Art de Vérifier les dates,*" and applied to that time the correction due to the difference in terrestrial longitude between Paris and Madura, and found that the result agreed very closely with the actual ending moment of the full moon tithi of Āshāḍha month in the year A.D. 634, according to Ārya siddhānta.

345. The verification of a solar eclipse is not so easy. Whether a particular solar eclipse was visible in India depends on whether any part of India was 30 degrees, 40 degrees or 50 degrees north or south of the central track of the eclipse, as we shall explain in paragraphs 351 to 355 below. The central track of a solar eclipse can be laid down only by an elaborate calculation, but the best books on eclipses, like the French work above referred to, and the more modern catalogues by OPPOLZER indicate the track of every important eclipse. Eclipses which could have been observed only in inaccessible regions of the earth, or which were wholly confined to America are not included in the French work, though they are in OPPOLZER. When an eclipse is alluded to in an Indian record, we do not generally know whether it was an eclipse strictly visible in India or an eclipse which, owing to the proximity of the sun to the moon's node, was bound to occur, and to be visible, somewhere on the earth. Table IV-L serves the useful purpose of indicating all possible eclipses, those visible somewhere in the northern half of the eastern hemisphere being printed in ordinary type, while those visible in India between A.D. 1 and A.D. 2000 are distinguished by asterisks. When the solar day on which an eclipse (solar) was due is indicated by italics in Table IV-L, it means that the eclipse will probably be found in OPPOLZER, but is not given in the French work, having been excluded from the latter, either because it was hardly noticeable, or because it did not occur in an inhabited part of the Old World. (The object of the French work, like that of the present work, is to help students of chronology in verifying dates; and eclipses which could have been observed only in the polar regions or in remote seas, are not catalogued by it : nor does it catalogue eclipses which could have been observed only in America, because before the discovery of America, there were no records in the New World, at any rate none that are available to us for study : we know that the Aztecs of Peru made astronomical observations in pre-Columbus days and have left behind pictorial records of the same, but no clue has been found which will enable us to decipher them). If *every* one of the 8,000 solar eclipses catalogued in OPPOLZER were taken into practical account, it would more often retard or confuse investigation than help it forward. For instance, if we turn to the entries of solar eclipses in the *calendar* year A.D. 1935, i.e., the year beginning on the 267th day of the Indian solar year A.D. 1934-35, corresponding to the 1st January A.D. 1935, we shall find three possible solar eclipses indicated in Table IV-L, on the 296th, 79th and 266th days. All these dates are, however, italicised in Table IV-L, because the French work omits them, but Mrs. TODD in her well-known book "*Total eclipses of the Sun,*" says: "as many as five solar eclipses in a single year are possible, but this happens very rarely ; the last occasion was early in the present century" (the book was published in 1894), "and it occurs only once—1935—in the next two and a half centuries." There is a similar remark about the year 1935 in YOUNG's *Elements of Astronomy* (1902), page 172. If we look in Table IV-L for the other two possible solar eclipses of the year 1935, we shall find them on the 267th day of the year 1934-35, and on the 108th day of the year 1935, i.e., two of the five eclipses here referred to must have occurred a month in each case before or after two other eclipses already noticed as possible. Such eclipses are hardly reckoned except in theoretical astronomy, because no eclipse that occurs on the 30th day after a previous eclipse is reckoned in practice ; in fact none of the eclipses of 1935 is assigned a track in OPPOLZER's maps, though all five are mentioned in his catalogue.

346. The reader will notice that—

(1) in certain lines of Table IV-L (and these are cases in which the sun was very near a node), eclipses, whether solar or lunar, recur almost as many times as there are cycles ; while

(2) in other lines a solar or a lunar eclipse is quite exceptional;

(3) in a few lines again all the figures are in italics, i.e., there was no eclipse which the French work thought it worthwhile to record, though most of these eclipses (if solar), will be found in OPPOLZER;

Lastly, (4) there are a few lines in which the distance of sun from node, marked in column 1 of Table IV-L is beyond the theoretical limits of possibility (i.e., beyond 18·9 degrees in the case of solar, and 13·9 degrees in the case of lunar eclipses), and nevertheless there are one or two eclipses even in these lines (see for instance, paragraph 364 below), due, no doubt, to the fact that the distance was brought within possible limits by reason of the sun's and moon's anomalies.

When, in an investigation, we come across ancient eclipses corresponding to those in Table IV-L (i.e.) to eclipses in years which were later by 1,711 years or multiples thereof, we should class the first of the four kinds of eclipses above referred as certain, the second as possible, the third as highly improbable, and the fourth as quite exceptional. Of course, if the solar day of a year under investigation is not cyclically repeated in Table IV-L (i.e., repeated after 1,711 years or a multiple thereof, with a difference of only 2 days for every such cycle), we may safely conclude that a solar eclipse was impossible on such a day. To justify us in asserting more than this in the four classes of cases, e.g., to justify the conclusion that a particular ancient solar eclipse was visible in some part of India, we need a very elaborate calculation, or a positive authority like OPPOLZER.

347. Table IV-L may be studied from different points of view:

(1) It shows practically for all time all the possible positions of the sun with reference to the nodes at which an eclipse could occur. A series of positions for 58 years, column 1 of table IV-L, having been once ascertained, may be continued, as shown in the head-lines of that table, for 1,711 years and after 1,711 years the series must recur, with a difference of only two days in the day of the solar year. As to this we may satisfy ourselves from table IV-L itself by comparing, for instance, the eclipses of A.D. 1 with those of A.D. 1712, or the eclipses of A.D. 257 with those of A.D. 1968.

(2) Table IV-L shows, in ordinary type, the eclipses of the Old World, as defined in paragraph 345 supra. These are the only eclipses with which the student of chronology in any country is likely to be concerned, until we come to quite modern times, i.e., to the 15th and subsequent centuries.

(3) Table IV-L marks with asterisks the solar eclipses visible anywhere in India between A.D. 1 and A.D. 2000.

(4) Table IV-L marks all other eclipse positions in italics. Most of these, in the case of eclipses of the sun, may be traced in OPPOLZER, though by reason of their being penumbral or of their having their central tracks elsewhere than in the Old World, they would not ordinarily interest the student of chronology.

(5) Table IV-L does not distinguish between eclipse positions, italicised because they lie outside the limits within which eclipses are possible, and small, remote or penumbral eclipses, which, though catalogued as such by OPPOLZER, do not interest the student of chronology. For instance, in the lines beginning with A.D. 11, 96·9th day (sun from node 340·26°) and A.D. 29, 107·5th day (sun from node 340·74°) the limits of an eclipse noted in paragraph 330 (18·9 degrees from a node) are exceeded and most of the eclipse positions in these lines do not figure in OPPOLZER; but there are exceptions like A.D. 1664, 136th day and A.D. 1682, 147th day (noticed in paragraph 364 below) due to the fact that the sun's anomaly brings the sun at this time of the year (August) two degrees nearer the node, that is, to within eclipse limits. Similar remarks apply to the line beginning with A.D. 17, 120th day (sun from node 199·98 degrees) and A.D. 18, 139th day (sun from node 161·26°).

348. We may analyse with the aid of OPPOLZER all the 39 eclipses in one line of Table IV-L, namely, the line beginning with A.D. 19, 276th day, and ending with A.D. 1980, 120th day.

A.D.	Day of Indian solar year.	Day of English calendar year by Table IV m.	Sunrise.		Noon.		Sunset.		Remarks.
			Long	Lat.	Long	Lat.	Long.	Lat	
19	275·6*	Dec. 15	+ 89	− 4	+ 153	− 26	− 145	0	
77	*234·5*	Nov. 4	− 94	+ 7	− 36	− 21	+ 31	− 18	America and Africa.
135	193·4*	Sep. 24	+ 82	+ 6	− 146	− 13	− 148	− 30	
193	*152·3*	Aug. 14	− 102	− 2	− 42	− 1	+ 15	− 27	Do
211	163·0	Aug. 25	+ 148	− 3	− 152	− 8	− 94	− 33	Pacific Ocean.
269	121·9	July 16	− 109	− 4	− 49	+ 13	+ 9	− 11	America and South Africa.
327	80·8*	June 6	+ 45	− 13	+ 104	+ 31	+ 172	+ 10	
385	39·7*	Apr 26	+ 126	− 20	− 179	+ 19	− 109	+ 29	
412-3	363·8	Mar. 17	− 121	− 15	− 62	+ 15	+ 4	+ 43	
500-1	*322·7*	Feb. 3	+ 124	+ 14	− 169	− 5	− 113	+ 32	
558	*281·6*	Dec. 26	− 143	− 5	− 80	− 21	− 24	+ 10	
576-7	292·3*	Jan. 6	+ 95	− 10	+ 160	− 20	− 145	+ 14	
634	251·2*	Nov. 25	− 58	+ 2	+ 4	− 23	+ 68	− 5	
692	*210·1*	Oct. 15	− 126	+ 5	− 64	− 21	+ 7	− 26	
750	*169·0*	Sep. 5	− 94	+ 2	− 34	− 10	+ 26	− 32	
808	127·9*	July 27	+ 83	+ 2	+ 147	+ 12	− 155	− 15	
866	86·8*	June 16	− 31	− 7	+ 29	+ 22	+ 95	+ 4	
884	97·5	June 26	− 141	− 7	− 80	+ 17	− 18	− 4	
942	56·4*	May 17	+ 134	− 13	− 171	+ 24	− 102	+ 20	
1000	15·3*	Apr. 7	− 13	− 16	+ 45	+ 22	+ 119	+ 38	
1057-8	339·5	Feb 25	− 93	− 18	− 29	+ 4	+ 32	+ 38	
1115	*298·4*	Jan. 16	− 175	− 10	− 112	− 11	− 60	+ 25	
1173	*257·3*	Dec. 6	+ 172	− 2	− 123	− 13	− 61	+ 2	
1231	216·2	Oct 26	+ 129	+ 3	− 169	− 25	− 89	− 21	
1249	*226·9*	Nov. 6	+ 2	− 1	+ 64	− 28	+ 135	− 19	
1307	*185·8*	Sep. 27	− 115	+ 5	− 57	− 18	+ 9	− 30	
1365	*144·7*	Aug. 17	− 133	+ 6	− 69	+ 1	− 9	− 25	
1423	103·6*	July 8	+ 109	− 2	+ 170	+ 15	− 131	− 10	
1481	62·5	May 28	− 123	− 5	− 71	+ 29	− 2	+ 17	
1539	21·4	Apr. 18	− 95	− 13	− 36	+ 26	+ 41	+ 34	
1557	32·1	Apr. 28	+ 150	− 14	− 151	+ 25	− 76	+ 28	
1614-5	356·2*	Mar. 29	+ 15	− 20	+ 78	+ 13	+ 141	+ 37	
1672-3	*315·1*	Feb. 16	+ 167	− 14	− 132	+ 1	− 76	+ 37	
1730-1	274·0*	Jan. 8	− 42	− 10	+ 27	− 20	− 86	+ 14	
1788	232·9	Nov. 27	− 157	− 4	− 94	− 30	− 27	− 12	
1846	191·8*	Oct. 20	− 1	+ 7	+ 59	− 19	+ 126	− 24	
1904	*150·7*	Sep. 9	+ 163	+ 8	− 133	− 5	− 70	− 27	
1922	*161·4*	Sep. 21	+ 43	+ 5	+ 106	− 12	+ 173	− 30	
1980	*120·3*	Aug. 10	− 169	+ 1	− 108	+ 4	− 52	− 23	

* Eclipses visible in India.

349. The columns in the above table headed "Sunrise, noon and sunset" with sub-headings "Longitude and latitude" give particulars of the central track of each solar eclipse (vide page 49, paragraph 137 supra) wherefrom we may form a very fair idea of the positions of the earth's surface where an eclipse was visible centrally, that is, along the path of the moon's shadow. But as will be explained presently in paragraphs 351 to 355 below, an eclipse is also visible for at least 30 degrees of latitude to the north and an equal number of degrees to the south of the central track.

350. The moon during an eclipse, as at any other time, travels from west to east, and during a solar eclipse its shadow after striking the earth travels rapidly from west to east. This means that if a solar eclipse is seen anywhere on earth at sunrise, it will be seen at sunset at the same moment in a remote part of the earth to the east; and in some part of the earth between these limits, it will be noon at the same moment. The above table indicates by longitude (Greenwich) and latitude the spots of the earth where it was respectively sunrise, noon and sunset during each solar eclipse ; and if we know the limits of latitude and longitude between which any country lies, we shall know (1) if that country or any part of it lay across the central track of the eclipse, and (2) whether in any part of the country the eclipse was visible, though not centrally, by reason of the central track passing within 30 or 40 degrees north or south of the country.

India (including Burma and Ceylon) lies between 5° and 35° north latitude and between 60° and 100° east longitude. Now, taking the first of the solar eclipses tabled above, that on 15th December A.D. 19, we see that the extreme length of the central track lay between 89° east longitude and 145° west longitude (—145° in the table means 145° longitude west of Greenwich), and a part of India (i.e., that between 89° and 100° east longitude) is comprised within these limits. Now the latitude of the central track was 4° south latitude (—4° in the table means 4° latitude south of the equator) and the eclipse, though not central, anywhere in India, was visible for at least 30° north of the central track and it must therefore have been visible over a great part of India, east of 89° east longitude.

The next solar eclipse in the table, i.e., that of 4th November A.D. 77, was central from 94° west longitude to 31° east longitude; in other words, the central track did not reach anything like the neighbourhood of India nor would it have been visible in Europe because the latitude of the central track was from 18° to 21° south latitude and from such a long way south of the equator, the eclipse could not have been seen in Europe. It is true that one part of the central track lay in 7° north latitude but its longitude was 94° west of Greenwich, which was in America not in Europe. The reader will notice that the eclipses marked with an asterisk in the above table as those which were visible in India conform to the above limits. He may, if he pleases, pursue the study of the rest of the table in the light of the above remarks.

351. We shall now subjoin a few useful remarks from the same French work as regards the limits of an eclipse whose central track is known: "An eclipse is visible at least 32 or 33 degrees to the north and as many degrees to the south of the central track; but there are times when an eclipse can be observed up to 64 degrees to the north or to the south of the central track. It is difficult to lay down precise rules on this point; but the following observations have the merit of being clear, although they may be wanting in absolute mathematical accuracy. We shall call the central track the umbra, and we shall give the name of penumbra to all that region of the earth which is comprised between the umbra and the regions where the eclipse is not visible; in other words, all the regions within which an eclipse is visible, outside the umbra, will be called the penumbra.

352. "In the month of June, that is to say, *towards the summer solstice*, at midday, if the umbra is in not more than 25 degrees of latitude, the penumbra will extend at most 32, 33 or 35 degrees to the north ; it will extend 41 degrees in the same direction if the umbra is in 40 degrees of latitude; and finally if the latitude of the umbra is 50 degrees, the extent of the penumbra has no limits, because it will extend as far north as the sun illuminates the earth. Towards the

south, the penumbra will extend 32, 33, 34, or 35 degrees as long as the latitude of the umbra does not exceed 60 degrees (north latitude). At 70 degrees of latitude for the umbra, the extent of the penumbra will be 38 degrees to the south; the umbra being in 80 degrees of latitude (north), the penumbra will extend 42 degrees south of that latitude; when the umbra is in 90 degrees of latitude, that is, at the pole, the penumbra will extend 47 degrees to the south of the pole; and when the umbra is in 100 degrees of latitude, that is 10 degrees beyond the pole, the penumbra will extend 53 degrees south of the track. We see that in the last case the penumbra may extend down to France; in fact, since the track of the umbra is then in 100 degrees of latitude (that is 10 degrees beyond the pole) and since the penumbra extends for 53 degrees south of the central track, by subtracting 53 from 100 degrees, we obtain 47 degrees of latitude for the extent of the penumbra; in this case the eclipse will be visible in all parts of France, of which the latitude exceeds 47 degrees. What has been stated concerning the month of June at noon should be applied to the month of March or *the vernal equinox at sunset*, and to the month of September or the *autumnal equinox at sunrise*.

353. "*At the equinoxes at noon*, the extent of the penumbra is 32 or 33 degrees to the north if the track of the umbra lies along the equator or south of it. When the umbra is in 10 or 20 degrees of north latitude, the penumbra will extend for 37 or 44 degrees to the north of such latitude. Lastly, if the umbra runs along 26 degrees of latitude, the penumbra will extend for 64 degrees more to the north, that is to say, as far as the pole. Towards the south, the penumbra will not extend over more than 35 degrees, so long as the latitude of the umbra is not more than 35 degrees. Corresponding to a central track of the umbra in 50 degrees of latitude, is an extent of 38 degrees for the penumbra; if the umbra is in 60 degrees of latitude, the penumbra extends 42 degrees to the south thereof; if the umbra is in 70 degrees of latitude, the penumbra extends over 48 degrees to the south; when the umbra is in 80 degrees of latitude, the penumbra extends 55 degrees south; and if the umbra is at 90 degrees of latitude, that is to say at the pole, the penumbra extends 64 degrees that is to say, to regions of which the latitude is 36 degrees north. The same remark may be made about *the solstice at sunrise and sunset*; with this difference, that at the time of the solstices, when the sun is near the horizon, the extent of the penumbra is a little less to the north and a little more to the south than it is *at noon at the time of the equinoxes*; the difference is, however, not very considerable except in high latitudes.

354. "In the month of December, or *at the winter solstice, at noon*, when the central track runs through 3½ degrees of south latitude, the extent of the penumbra is 44 degrees to the north; and when the umbra is 2½ degrees north latitude, the extent of the penumbra is 64 degrees, that is to say, the penumbra will then touch the polar circle, beyond which, in winter, there can be no daylight. The penumbra extends south over 36, 41, 50 or 64 degrees of latitude, according as the latitude of the umbra is 20, 35, 50 or 66½ degrees north latitude. The same remarks apply to eclipses *in March at sunrise*, and to those *in September, at sunset*.

355. "If the extent of the penumbra is 32, 33, 34 or 35 degrees, we can divide that extent into twelve nearly equal parts, and we shall have, as a result, the regions where the eclipse will appear to be one of 11 digits, of 10 digits, of 9, etc. If the penumbra is wider than the above limits, the interval between the digits will be more or less unequal; generally speaking, this distance is less towards the equator and greater towards the pole. In June at noon, in March at sunset, and in September at sunrise, there is a difference of one digit for every 2¾ degrees in the tropics, for every 3 degrees under the 45th parallel of latitude, and of 4 degrees in the polar circle. At the time of the equinoxes, at noon, and at the time of the solstices, sunrise or sunset, there is a variation of one digit for every 3 degrees in the tropics, for every 4 degrees under the 45th parallel of latitude, and for every 8 degrees in the polar circle. At the winter solstice, at noon, and also in March at sunrise and in

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September at sunset, the variation is one digit for every 4 degrees in the tropics, for every 8 degrees under the 45th parallel of latitude and for every 15½ degrees in the polar circle. These depths of the penumbra and these variations of digits are subject to a thousand further variations dependent upon the relative distances of the sun, the earth and the moon at the time of an eclipse. The figures given above are however, those corresponding to the average distances of these bodies."

356. The cycles of eclipses which we studied in paragraph 348 *supra* practically never fail because they go on for 1,711 years with practically no alteration in the distance of the sun from the node; and after 1,711 years (Indian sidereal) *less* 2 days, the sun returns to absolutely the same distance from the node as at the beginning of the 1,711 years' cycle. It will be interesting to study, by contrast, what happens if we follow a shorter cycle, the saros of 18 years *plus* 10·7 days, uninterruptedly, for a long period. Mrs. Todd in her book: '*Total eclipses of the Sun*,' gives, at page 194, a short but lucid description of such a series of eclipses. "The advent of a slight partial eclipse near either pole of the earth will herald the beginning of a new series. (On the average new cycles will begin at intervals of 30* years.) At each succeeding return, conformably to the saros, the particular eclipse will move a little further towards the opposite pole, its magnitude gradually increasing for about 200 years, but during all this time only the lunar penumbra will impinge on the earth. But when the true shadow (or umbra) begins to touch, the obscuration will have become annular or total near the pole where it first appears. The eclipse has now acquired a track, which will cross the earth slightly farther from that pole every time it returns, for about 750 years. At the conclusion of this interval, the shadow path will have reached the opposite pole: the eclipse will then become partial again, and continue to grow smaller and smaller for about 200 years additional. The series then ceases to exist, its entire duration having been about 1,150 years."

357. We shall illustrate this description by a practical example. In Table IV-L, A.D. 199, on May 13th (= 57th day of the Indian solar year), the distance of the sun from the node was 341·78 degrees, which, by our rule in paragraph 140, page 50, is near the extreme limit for the possibility of a solar eclipse. In fact neither on this day nor on the next saros, A.D. 217, May 23, is an eclipse marked (Table II). But at the next saros, A.D. 235, June 3, an eclipse is marked which is thus described in the French work :—

"6 a.m. Paris time: very small eclipse in the north of Europe."

Similar remarks, but showing that the eclipse gradually widened in area though without a track of its own, occur at the following 7 successive saroses: (2) A.D. 253, June 13; (3) A.D. 271, June 24, (4) A.D. 289, July 5, (5) A.D. 307, July 16, (6) A.D. 325, July 6, (7) A.D. 343, August 6.

We have now covered 150 years from the year A.D. 199, but according to Mrs. Todd, we must suppose the series of penumbral eclipses to have begun really 18 years earlier, that is at the new moon of May 1, A.D. 181, though it is not marked even in Oppolzer.

Two hundred years after this last date, we come upon a saros A.D. 379, August 28, when there was a solar eclipse marked in the French work, and having a track of its own. For it is thus described:—"Annular; time, Paris 0·30 p.m.; Europe and Asia; Central in the 88th parallel of latitude (that is near the pole) and 13 degrees longitude west of Greenwich; central also in the 83rd parallel of latitude and the meridian where it was then noon, that is, the meridian of Paris; central also in the 53rd degree of latitude and the 90th degree of long. east of Greenwich." So we can lay down the central track of this eclipse, from 88 degrees north latitude, 13 degrees west longitude, through 83 degrees north latitude, 2 degrees east longitude, to 53 degrees north latitude, 90 degrees east longitude. We notice that according to Mrs. Todd, "the obscuration has become annular near the pole where it first appeared" and that "the eclipse has now acquired a track."

At each successive saros, which can be easily followed by adding 18 years and 10 or 11 days every time, the eclipse crossed the earth, as stated by Mrs. Todd,

* Exactly, 29 years less 20·6 days, as we have already seen.

slightly farther and farther everytime from the north pole, for about 750 years. A.D. 1118, November 15, (Table II or IV-L) was the last saros in this series, at which an eclipse is marked, and it had by now reached the South pole. There are no further saroses with eclipses in this series.

358. There is a close connexion between the series of saroses described by Mrs. Todd and the sun's distances from the node, tabulated in Table IV-L. On the 1st May, A.D. 181 (46th completed day), when the series above studied began, the sun's distance from the node was, by Table IV-L, 341·78° minus ·25°, which is equal to 341·53 degrees. This is about the limiting distance for an eclipse of the sun, and we see from Mrs. Todd's description and our illustration that when the sun's distance from the node is at this limit, the penumbra is just beginning to touch the earth at the north pole. We know that after every 18 years and 10½ days, the sun's distance from the node increases by ·4762 of a degree, and that since 30 degrees is almost exactly equal to 63 × ·4762°, it must be 63 saroses, that is 1,136 years, before the sun's distance from the node passes from 341·53 degrees, to 341·53 degrees *plus* 30 degrees, which is equal to 11·53 degrees, i.e., the distance will be 11·53 degrees in A.D. 181 *plus* 1136, which is equal to A.D. 1317, March 13 (Table II). On that day, being the 352nd day of the Indian solar year, A.D. 1316-17, the distance of the sun from the node was, by Table IV-L, 11·41 *plus* ·11 (vide head-lines of Table IV-L), which is equal to 11·52, just what we expected.

359. According to Mrs Todd, if a new series of saroses began at the north pole about A.D. 180, the eclipse would acquire a central track near the pole about A.D. 580, it would cross the earth farther and farther from that pole for 750 years, and about A.D. 1138 it would have reached the other pole and cease to yield any eclipses after another 200 years. We have seen by actual investigation that a series of saroses beginning on 3rd May of A.D. 181, when the sun's distance from the node was 341·53 degrees, did yield an eclipse with a track near the north pole on 28th August 379 (164th day), when the sun's distance from node was, by Table IV-L (line of 14 A.D.), 346·79 degrees; that about 730 years after this date, that is on 15th November A.D. 1118 (236th day), when the sun's distance from the node was 6·39 degrees, the last eclipse of the series occurred near the south pole, and that in 200 years more, that is about A.D. 1317, the series ceased to yield any eclipses, although the sun's distance from the node was only 11·52 degrees. In fact we could have gone on for another 100 years before reaching anything like the distance of sun from node at which eclipses become uncertain: but the number of these imperceptible eclipses is really undetermined. Instead of Mrs. Todd's 1150 years, which is 64 saroses, another popular authority, *Chambers' Story of Eclipses* (Hodder and Stoughton, 1902), gives "70 saros or more than 1,200 years" for the total length of an eclipse series from pole to pole. In practice, it is well to remember (1) that the sun's distance from the node increases from 15 degrees *less* than 360 degrees, to 15 degrees *more than* 360 degrees in exactly 63 saroses, or 1,136 years less 56 days; (2) that in 613 years (tropical) the saros repeats itself nearly on the same day of the European or Julian calendar: for there were exactly 34 saroses of 18 years and 10·7 days each between A.D. 181, May 13, when our eclipse was fringing the north pole and 14th May, A.D. 812 when there was a total eclipse in the same series, central in 30 degrees north latitude when it was noon there, i.e., in the meridian of Paris; (3) that in 1226 tropical years (1226 Indian sidereal years less 5 days) there are exactly 68 saroses, which may be regarded as the total length of an eclipse series from pole to pole.

360. Given a particular solar eclipse, say, the very first one recorded in Table II, on 10th June A.D. 1, what, the reader may ask, was its place in the series of eclipses which we have supposed must have gone on uninterruptedly for 1,200 years and must have consisted of 63 to 70 saroses of 18 years and 10½ days each? We cannot answer this question (if we do not use Table IV-L) except by following the tracks of the same eclipse through successive saroses with the aid of the French work or of Oppolzer. There are, absolutely, about 43 solar eclipses in the course of a saros of 18 years and 10½ days. Each of these eclipses will have to be

followed through a period of about 900 years (as we did from the eclipse of June 3, A.D. 235 to the eclipse of November 15, A.D. 1118) before we can place a given eclipse in its proper position among the 60 odd eclipses of *its* series. When we have taken all this trouble, we shall still be in considerable doubt about the eclipses for the first two hundred and fifty and the last two hundred and fifty years of a series of seventy saroses.

361. It will be instructive, however, to follow, in the light of the above remarks, the history, as far as we can trace it through Table II, of the eclipses in the first saros of the Christian era (A.D. 1 to A.D. 18). We shall note in each case (1) whether the track of the eclipse advanced from the north pole to the south pole, or in the reverse direction; (2) the last eclipse in the series of saroses which is entered in Table IV-L; (3) the distance of the sun from the node, according to Table IV-L, at the last recorded eclipse in the series.

—	S. to N pole;—last recorded eclipse.	S. to N. pole;—Distance of sun from node at last eclipse.	N. to S. pole;—last recorded eclipse	N. to S Pole;—Distance of sun from node at last eclipse.
		Degrees.		Degrees
1. A.D 1, June 10	A.D. 506, Apr. 9	196·95	...	.. ...
2. A.D. 2, May 30	A D 705, July 25	193·92	...	...
3. A.D. 2, Nov. 23	.. ..	...	A D 814, Mar. 24	12·77
4. A.D. 3, Nov. 12 ...	... ..	...	A.D. 959, June 8	8 53
5. A.D. 4, Apr. 8	A.D. 148 July 3	193·75	.....	...
6. A.D. 5, Mar. 28	A.D. 437, Dec. 13	193·44	.. ...	...
7. A D. 5, Sep. 21	... .		A.D. 402, May 18	8 38
8. A.D. 6, Sep. 11	......	..	A.D. 637, Sep 24	6·39
9. A.D. 7, Feb. 6	A D. 97, Apr. 1	198·94	... .	...
10. A.D. 7, Aug. 31	A.D. 412, Apr. 27	195·21	... .	...
11. A.D. 8, Jan. 26	A.D. 242, June 15	194 40	...	...
12. A.D. 9, July 10	......		A.D. 568, June 10	11 41
13 A.D. 10, June 30	......	. .	A.D. 659, July 24	5·36
14. A.D. 10, Nov. 24	A.D. 101, Jan. 17	197 48	... ..	...
15. A.D. 11, Nov 14	A.D. 336, May 27	195·43	... .	...
16. A.D. 12, Nov. 2	A D. 784, Jan. 10	197·89	. ...	.
17 A.D. 13, Apr. 28	......	...	A.D. 662, May 23	11·89
18 A.D. 14, Apr. 18	. ...	...	A.D 843, Aug. 29	8 86
19. A.D. 15, Sep. 2	A.D. 412, Apr. 27	195·91	.....	...
20 A.D. 16, Aug. 21	A.D. 647, Sep. 4	193·92	. ...	...
21. A.D. 17, Feb. 15	......	...	A.D 648, Feb. 29	9·96
22. A.D. 18, Feb. 4	......	...	A.D. 883, July 8	8·14
23. A.D. 18, July 1	A.D. 126, Sep. 4	194·94	. ....	...

362. We notice first, with reference to the statements made in paragraphs 345 and 360 supra, that there were not anything like 43 solar eclipses in this saros, A.D. 1 to A.D. 18; for there were only 23 eclipses actually registered and even among these 23, we have been obliged to include one or two which are not found actually registered, but which we have every reason to suppose occurred near either pole, particularly the south pole. Secondly, we notice that in all the eclipses travelling from the north to the south pole, the distances of the sun from the node range about 360°; whereas in the eclipses travelling from the south to the south pole, the distances of the sun from the node range about 180°. This is

an important practical deduction. Thirdly, we notice, that while the distance of the sun from the node, in the case of eclipses travelling from the south to the north pole, reaches the theoretical limit of 19° (vide paragraph 330 supra), the distance of the sun from the node in the case of eclipses travelling in the opposite direction scarcely reaches 10°.

363. The third observation made in the last paragraph is the one that most concerns us in chronology. The eclipses that most interest us in chronology are those recorded in the northern, or the *land* hemisphere of the earth, as it was known up to the 16th century A.D. For until A.D. 1492, the date of the discovery of America, the nations that have recorded historical or chronological events were practically unacquainted with any country south of the equator, whereas they were acquainted with countries up to within 40° of the north pole. If we graph the observations made in paragraphs 351 to 355 supra, and apply to eclipses with tracks south of the equator what is there said about eclipses whose central tracks are in northern latitudes, we shall find that for an eclipse to be visible as far north as the tenth degree of northern latitude (the latitude of Madura), the central track, south of the equator, should not be below the twentieth degree of south latitude ; whereas an eclipse whose central track is near the north pole will be visible as we have seen, in France. Therefore, in chronological investigations, we take into account all eclipses whose central tracks are between the north pole and 20 degrees south of the equator, and eclipses whose central tracks are between the twentieth degree of south latitude and the south pole are neglected. If we suppose the whole course of an eclipse to be 180°, from the north to the south pole, or vice versâ, we neglect a third of the track which begins, or ends, with the south pole.

364. A solar eclipse can take place as long as the sun at the time of new moon is not more than 19° removed from a node. In the above list of eclipses belonging to the first saros in the Christian era, A.D. 1 to A.D. 19, we see four eclipses ending with the north pole, in which the extreme distance of the sun from node was 17°, 18° or 19°; whereas, in the case of eclipses travelling from the north to the south pole, the extreme distance of the sun from the node at any recorded eclipse reached nearly 13° in only one case, and in most cases was less than 9°, and there are no eclipses corresponding to the last 10°, or a third of the arc of 30° (15° on either side of each node, between which limits, according to paragraph 330 supra, the sun is to be found during a solar eclipse). The reason is not that there was no eclipse when the sun was between 9° and 19° distant from a node, but that the central track of such eclipses was so far south of the equator that the eclipses could not have been observed as such any where north of the equator. Among eclipses beginning at the north pole, we have a few cases on record, where the distance of the mean sun from the node was at the extreme limit of 341·1°, or even a little beyond, the sun's distance from the node at which an eclipse is ordinarily possible. Such cases are the following:—

340·74° (A.D. 1682, 147th completed day = August 22.

(*N.B.*—By Table IV-C sun's anomaly on 147th day would bring the sun 2° nearer the node.)

341·78°. A.D. 7, 564, 622, 1045, 1237, 1660, 1718.

341·22°. A.D. 470, 662, 1027, 1143.

Beyond 342°, solar eclipses became fairly frequent; and they become more frequent as the distance of the sun from the node approaches 360° or 0°. When the sun's distance from the node is between 0° and 5°, the number of eclipses is still frequent but in the neighbourhood of 7°, the recorded eclipses are few, and confined to those visible in India; see the lines against 7·35° (A.D. 58), 6·87° (A.D. 40), 7·91° (A.D. 18), 6·39° (A.D. 22). When the sun's distance from the node is about 9°, and a *fortiori* when it is more than 9°, there are practically no eclipses in our record (Table IV-L.), for the reason already investigated, viz., that chronology does not take account of eclipses which are visible only in southern latitudes. Of course an eclipse which is central in southern latitudes may be visible in Northern latitudes (vide paragraph 354 supra).

365. Conversely, in the case of eclipses whose tracks gradually advance northwards, beginning at the South Pole and ending at the North Pole, and which are indicated by the sun's distance from the node being within 19 degrees on either side of 180°, we find that eclipses near the South Pole, when the sun's distance from the node is between 161° and 171°, are either not represented at all in Table IV-L or are represented (towards the end of this limit) by eclipses visible only in South-East Asia (including India). Above 170° and up to 197°, we have the largest number of recorded and observed solar eclipses, and we lose count of their tracks only when they have reached the North Pole. These are important indications which will guide us in the investigation of ancient eclipses.

We subjoin tables showing the daily and yearly joint motions of the sun and node (1) from 1 to 99 days, and (2) from 1 to 20 years. It will, however, seldom be necessary to refer to these tables because the exact distance of the mean sun from the node at any new moon or full moon, at which an eclipse could possibly occur, in times ancient or modern, can always be ascertained at a glance from column 1 of Table IV-L, the cycle of 1711 years being used when necessary.

(1) *Joint motion of sun and node from* 1 *to* 99 *days.*

Days.	Degrees.	Days.	Degrees.	Days.	Degrees.
1	1°. 0386	34	35°. 3124	67	69°. 5863
2	2°. 0772	35	36°. 3510	68	70°. 6249
3	3°. 1158	36	37°. 3897	69	71°. 6635
4	4°. 1544	37	38°. 4283	70	72°. 7021
5	5°. 1930	38	39°. 4669	71	73°. 7407
6	6°. 2316	39	40°. 5055	72	74°. 7793
7	7°. 2702	40	41°. 5441	73	75°. 8179
8	8°. 3088	41	42°. 5827	74	76°. 8565
9	9°. 3474	42	43°. 6213	75	77°. 8951
10	10°. 3860	43	44°. 6599	76	78°. 9337
11	11°. 4246	44	45°. 6985	77	79°. 9723
12	12°. 4632	45	46°. 7371	78	81°. 0109
13	13°. 5018	46	47°. 7757	79	82°. 0495
14	14°. 5404	47	48°. 8153	80	83°. 0881
15	15°. 5790	48	49°. 8529	81	84°. 1267
16	16°. 6176	49	50°. 8915	82	85°. 1653
17	17°. 6562	50	51°. 9301	83	86°. 2039
18	18°. 6948	51	52°. 9687	84	87°. 2425
19	19°. 7334	52	54°. 0073	85	88°. 2811
20	20°. 7720	53	55°. 0459	86	89°. 3197
21	21°. 8106	54	56°. 0845	87	90°. 3583
22	22°. 8492	55	57°. 1231	88	91°. 3969
23	23°. 8878	56	58°. 1617	89	92°. 4355
24	24°. 9264	57	59°. 2003	90	93°. 4741
25	25°. 9650	58	60°. 2389	91	94°. 5127
26	27°. 0036	59	61°. 2795	92	95°. 5513
27	28°. 0422	60	62°. 3161	93	96°. 5899
28	29°. 0808	61	63°. 3547	94	97°. 6285
29	30°. 1194	62	64°. 3933	95	98°. 6671
30	31°. 1580	63	65°. 4319	96	99°. 7057
31	32°. 1966	64	66°. 4705	97	100°. 7443
32	33°. 2352	65	67°. 5091	98	101°. 7829
33	34°. 2738	66	68°. 5477	99	102°. 8215

(2) *Joint motion of sun and node from* 1 *to* 20 *years.*

Years.	Degrees.	Years.	Degrees.	Years.	Degrees.
1	19°. 3582558	8	154°. 8660464	15	290°. 3738374
2	38°. 7165116	9	174°. 2243022	16	309°. 7320932
3	58°. 0747674	10	193°. 5825584	17	329°. 0908490
4	77°. 4330232	11	212°. 9408142	18	348°. 4486048
5	96°. 7912790	12	232°. 2990700	19	7°. 8068606
6	116°. 1495348	13	251°. 6573258	20	27°. 1651164
7	135°. 5077906	14	271°. 0155816		

TABLES

EYE-TABLES.

SŪRYA SIDDHĀNTA EYE-TABLE—Specimen problems.

This Eye-table **alone** will enable any one to solve correctly, to four decimal places of a day, and by a single operation, any problem in solar dates, nakshatras, or week-days, for 5,100 years, i.e., from B.C. 3102 to A.D. 1999. The tables of equations are given to two places of decimals in the abridged sections **e** to **i** of the Eye-table—see next page—and to four places of decimals in the unabridged sections **e** to **i**, pages 171 to 188 below.

The computation of the ending moment, whether of a tithi, a nakshatra, or a yoga, always comprises four processes: (1) to find the mean ending moment, (2) to find the anomaly or anomalies for that moment, (3) to find the equation or equations corresponding to the anomaly or anomalies, and (4) to add together the mean ending moment and the equation or equations.

Problem I.—Required to find the ending moment, by Sūrya siddhānta, *of Āshāḍha Śukla 13, A.D. 484.* Note stages **(1)** to **(10)**.

Commencement of solar year. Col. 1	Days of solar year and sun's anomaly in days of S. Yr. Col 2	Moon's anomaly. Col. 3
A.D. 400 ... ... Mar. 17·48569 **k**	First new moon in solar year. { A.D. 400 ... 23·84466 **l**	21·75228 **m**
84 years ... ·73554 **n**	84 years 0·54523 **o**	18·48585 **p**
A.D. 484–5 ... Mar. 18·22123 **(1)**	A.D. 484 ... 24·38999 **(2)**	24·38999 **(2)** (1st N.M. in solar year).
N.B.—This, by itself, is a valuable piece of information, giving the English year, month, day and fraction of day on which a particular Indian solar year between 3102 B.C. and A.D. 2000 commenced, and it may be had in a few seconds from the Eye-table, sections **k** and **n** for any one of 5,100 years.		59·60812
		−55·1090 **d** (2 anom. months)
		4·4991 **(3)** (☾'s An. at 1st N.M. in S. Yr.)
	Add for Āshāḍha new moon 59·0612 **b**	... 3·952 **c**
	Do. 12 tithis ... ... 11·8122 **d**	...11·812 **d**
	95·2634 **(4)**	20·263
		−·045 (☉'s equation—**h**).
		20·918 **(5)**
Note how stages **(1)**, **(2)**, **(3)**, **(4)**, **(5)**, **(6)**, **(7)** and **(8)** are successively arrived at with the help of the Eye-table and then add together **(4)**, **(8)** and **(1)**, as shown in column 2.	Sum of ☉'s and ☾'s eqns. (col. 3) ... ... + ·3685 **(8)**	☉'s eqn. for An of 95·26 d **(4)** ... − ·0453 **h** **(6)**
	95·6319	
	Add commencement of solar year A.D 484–5 Mar. 18·2212 **(1)**	☾'s eqn. for An. of 20·918 d. **(5)** ... + ·4138 **e** **(7)**
	Mar. 113·8531 **(9)**	Sum of ☉'s and ☾'s eqns. + ·3685 **(8)**

We reach, for the ending moment of the tithi, the result, March 113·8531 **(9)**. By Eye-table **q**, the 93rd day from March 1 is June 1.
∴ The 113th day from March 1 is June 1 + 20 = June 21 **q**, and by Eye-table **r**, ·8500 of a day = 51 ghaṭikas and ·0031 day = 11 palas **(10)**.

For the week-day, we have, for 21 June **A.D.** 484, by Eye-table **j**, 2 + 0 + 3 + 21 = 26; 26 ÷ 7 leaves remainder 5, i.e., Thursday.

∴ The ending moment of the tithi was 51 ghaṭikas 11 palas after mean sunrise, on Thursday, 21 June A.D. 484 which is identical with the result reached by Mr. Dikshit in the *Introduction to Dr. Fleet's Gupta Inscriptions*, p 157 .. ... **(10)**.

Problem II.—Problem I worked to four places of decimals, with the aid of table II and Eye-tables **y**, **e** *and* **h**.

N.B.—The above problem can be worked in a much shorter time with the additional help of Eye-table **y** (p. 158) and Table II (p. 218).

		Days of S. Yr. and sun's anomaly	Moon's mean anomaly in days
Table II. First new moon in solar year A.D. 484–85		... 24·3900	... ... 4·498
Eye-table **y**. Āshāḍha Śu 12		... 70·8734	... ... 15·764
		95·2634	20·262
Eye-table **h**. ☉'s eqn. for anomaly of 95·26 days	− ·0453	→→ →→	☉'s eqn. − 0453
Eye-table **e** ☾'s eqn. for anomaly of 20·216 days ...	+ ·4138		20·216
	+ ·3685	... + ·3685	
		95·6319	
Add English month and day, marking commencement of Indian solar year A.D. 484–5 (Table II)		Mar. 18·2212	

Mar. 113·8531 = June 21, A D. 484, 50 ghaṭikas 11 palas after mean sunrise (Eye-tables **q** and **r**).

Same problem.—**The shortest method,** and the one ordinarily recommended. In general, it will be quite enough to obtain a result correct to two places of decimals, as in the Ephemeris, and this of course will take less time.

			Days.	Moon's anomaly in days.
Table II. New moon tithi, Āshāḍha, A.D 484–85 ...	**(7)*** June 9·67	Table II. 1st N.M. in S. Yr. A.D. 484–85...	24·39	An of 1st N.M. in S. Yr. 4·50
Eye-table **d** *Add* for 12 tithis ..	... .. 11·81	Eye-table **y**. *Add* for Āshāḍha Śu. 12 ...	70·87	.. .. 15·76
	(19) June 21·48		95·26	20·26
		Eye-table **h** ☉'s eqn for An. of 95·26 days	− ·04	→→ →→ − ·04
				20·22
		☾'s eqn. for An. of 20·22 d. —	+ ·41	
	+ ·37	←← ←←	+ ·37	
	(19) June 21·85, i e., Thursday, 21st June, A.D. 484 at ·85 of day.			

* *N.B.*—This **(7)** is the week-day, Saturday, to which we add 12, since the days of June, 9, are increased by 12 when 12 tithis or 11·81 days are added. Resulting week-day, 19, i.e., 19 ÷ 7 which leaves remainder 5, or Thursday.

Problem III.—Required the ending moment of nakshatra **Anurādhā** (No. 17) *in June, A.D. 484.*

N.B.—We do not require ☉'s An. for this (see paragraph 97, p. 83 of Text).

		Moon's anomaly in days.
Table II. Ending moment mean of new moon tithi, Āshāḍha, A.D. 484	**(7)** June 9·67	
Anomaly of Āshāḍha N.M., i.e., An. at 1st N.M. in S. year, 4·50 (Table II) + 3·95 [addn. for Āshāḍha N.M. by Eye-table **c**]	... ...	... ... 8·45
Eye-table **s**. Shortest interval from Āshāḍha N.M. to No. 17 Anurādhā nakshatra ...	. ... 10·74	... ... 10·74
Eye-tables **t**, **u**. Nak. corrn. for 1st N.M in S. year, 24·39 d., i.e., corrn. for 24 days, +0·41 **(t)** *less* corrn. for ·39 day, ·03 **(u)**; Total correction	... ... + 0·38	→→ →→ ... + 0·38
Eye-table **f**. ☾'s nak. eqn. for anomaly of 19·57 d. (last col.) ...	.. + ·38	19·57
	19 June 21·17	i e., Thursday, 21st June, at ·17 of day.

Problem IV.—Required the ending moment of yoga **Śukla** (No. 24) *in June A.D. 484. N.B*—We require sun's anomaly for yogas, v. p. 36.

		Sun's anomaly in days, and sun's and moon's equations.	Moon's anomaly in days
Table II. Ending moment of mean new moon tithi, Āshāḍha, A.D 484–85	**(7)** June 9·67	1st N.M. in S Y. .. 24·39	☾'s An. at 1st N.M., S.Y. 4·50
Eye-tables **b** and **c**	...	*Add* for Āshāḍha N.M. 50·06	. ... 3·95
Eye-table **v**. Shortest interval from Āshāḍha N.M. to yoga No. 24, Śukla	... 10·57	... . 10·57	... ... 10·57
Eye-tables **w**, **x**. Yoga corrn. for 1st N.M. in S.Y., i.e., corrn. for 24 days, 0·77 **(w)** *less* corrn. for ·39 day, 05 **(x)**	.. ... 0·72	.. .. 0·72	... ... 0·72
		94·74	19·74
Eye-table **i**. Sun's yoga eqn. for An. of 94·74 days (col. 2).	...	... ... + ·04	→→ →→ ... + 0·04
			19·78
Eye-table **g**. Moon's yoga eqn. for An. of 19·78 days (last col.)	... ...	... ... + ·35	
	+ ·39	→→ →→ ... + ·39	
	(19) June 21·35, i.e., Thursday, 21st June, at ·35 of day.		

EYE-TABLE FOR

NOTE.—The different parts of this Table are lettered in order from a to y and All the figures, except where otherwise indicated,

z Order of signs of zodiac or rāśis and ☉'s longitude at commencement ...	1 ..0°	2...30°	3...60°	4 ..90°
Bengal solar months ...	Vaiśākha.	Jyeshṭha	Āshāḍha	Śrāvaṇa
Tamil and Malayālam solar months; also names of rāśis ...	Mêsha	Vrishabha	Mithuna	Karkaṭāka
Tamil solar months ...	Chittirai	Vaigāśi	Āni	Āḍi
a Moment of sankrānti in days of solar year, and decimals of a day ...	0·0	30·9353	62·3556	94·0008
English date corresponding to each sankrānti (A.D. 1911) ...	Apr. 13	May 14	June 14	July 16
Lunar month: each month commences *before* sankrānti noted in *next* column ...	(*1*) *Vaiśākha*	(*2*) *Jyeshtha*	(*3*) *Āshāḍha*	(*4*) *Śrāvaṇa*
b Increase in days, (1) of lunar months, (2) of sun's anomaly ...	0·000	29·5306	59·0612	88·5918
c „ of ☾'s An when interval between Mesha sank. and 1st N.M. in sol. yr. is 0·00 day.	0·000	1·976	3·952	5·928

Tithi equivalents in days and

d Tithi equivalent in days ...	**1**	**2**	**3**	**4**	**5**
	·9843	1·9687	2·9531	3·9874	4·9218
	16	**17**	**18**	**19**	**20**
	15·7496	16·7340	17·7182	18·7027	19·6871

e, f, g Moon's equation of the centre and moon's anomaly in days and

	·00	**·01**	**·02**	**·03**	**·04**	**·05**	**·06**	**·07**	**·08**	**·09**	**·10**	**·11**	**·12**	**·13**	**·14**	**·15**	**·16**	**·17**	**·18**	**·19**	**·20**
−	00	·11	23	34	46	·58	·69	81	·93	1·04	1·16	1·28	1·40	1·52	1·64	1·77	1·89	2·02	2·14	2·27	2·40
−	13·78	13·68	13·59	13·49	13·40	13·30	13·20	13·11	13·01	12·91	12·81	12·71	12·61	12·51	12·41	12·31	12·20	12·10	11·99	11·88	11·77
+	13·78	13·87	13·97	14·06	14·16	14·25	14·35	14·45	14·54	14·64	14·74	14·84	14·94	15·04	15·14	15·24	15·35	15·45	15·56	15·67	15·78
+	27·55	27·44	27·32	27·21	27·09	26·98	26·86	26·74	26·63	26·51	26·39	26·27	26·15	26·03	25·91	25·79	25·66	25·54	25·41	25·28	25·15
−	0·00	0·12	0·25	0·37	0·50	0·62	0·74	0·87	1·00	1·12	1·25	1·38	1·51	1·61	1·77	1·90	2·04	2·18	2·32	2·46	2·60
−	13·78	13·67	13·57	13·46	13·36	13·26	13·15	13·05	12·94	12·83	12·72	12·62	12·51	12·40	12·28	12·17	12·06	11·94	11·82	11·70	11·58
+	13·78	13·88	13·98	14·09	14·19	14·30	14·40	14·51	14·61	14·72	14·83	14·94	15·05	15·16	15·27	15·38	15·50	15·61	15·73	15·85	15·98
+	27·55	27·43	27·31	27·18	27·06	26·93	26·81	26·68	26·56	26·43	26·30	26·17	26·04	25·91	25·78	25·65	25·51	25·38	25·24	25·10	24·95
−	0·00	0·13	0·26	0·40	0·53	0·66	0·79	0·93	1·07	1·20	1·34	1·48	1·62	1·76	1·90	2·05	2·19	2·34	2·49	2·65	2·80
−	13·78	13·66	13·55	13·44	13·33	13·22	13·10	12·99	12·87	12·75	12·64	12·52	12·40	12·28	12·15	12·03	11·90	11·78	11·64	11·51	11·37
+	13·78	13·89	14·00	14·12	14·23	14·34	14·45	14·57	14·68	14·80	14·91	15·03	15·15	15·27	15·40	15·51	15·65	15·78	15·91	16·04	16·18
+	27·55	27·42	27·29	27·16	27·02	26·89	26·76	26·62	26·49	26·35	26·21	26·08	25·94	25·79	25·65	25·51	25·36	25·21	25·06	25·91	25·75

h For tithis. Sun's equation of the centre and sun's anomaly in days of the solar

+·18	**+·175**	**+·17**	**+·16**	**+·15**	**+·14**	**+·13**	**+·12**	**+·11**	**+10**	**+·09**	**+·08**	**+07**	**+·06**	**+05**	**+·04**	**+·03**	**+·02**
358	0	7	16	23	28	33	38	42	46	50	54	57	61	64	68	71	74
354	343	334	327	321	315	310	305·5	301	297	293	289	286	283	279	276	273	269·5

i For yogas.—Sun's equation	**−·154**	**−·153**	**−·15**	**−·14**	**−·13**	**−·12**	**−11**	**−·10**	**−·09**	**−·08**	**−·07**	**−·06**	**−·05**	**−·04**	**−·03**
Anomaly in days of solar year	355·91	360	2	14	22	29	35	40	45	49	53	58	62	66	69
	354·64	350	342	330	322	315	309	304	299	295	290	286	282	278	274

j Perpetual almanac for European calendar.

[*N.B.*—Heavy type means week-day, Sunday being **1**, Monday **2**, etc.]

	1	**2**	**3**	**4**	**5**	**6**	**7** or **0**
Centuries B.C.	3001	3101	3201				
	2301	2401	2501	2601	2701	2801	2901
	1601	1701	1801	1901	2001	2101	2201
	901	1001	1101	1201	1301	1401	1501
	201	301	401	501	601	701	801
						1	101
Centuries A.D. old style.	500	400	300	200	100	0	
	1200	1100	1000	900	800	700	600
			1700	1600	1500	1400	1300
Centuries A.D. new style.	1600	1900		1800		1700	
	2000	2300		2200		2100	

N.B.—B.C. years should be made positive thus: B.C. 44 is 57th year of century beginning with 101 B.C.—see p. 14 of Text.

N.B.—Old Style ceased in continental countries (exc. Russia) on 4-10-1582 and New Style began on 15-10-1582, 10 days being dropped. In United Kingdom, New Style began on 14-9-1752, 11 days being dropped.

Odd years in a century.

1	**2**	**3**	**4**	**5**	**6**	**7** or **0**	**1**	**2**	**3**	**4**	**5**	**6**	**7** or **0**
1	2	3		4	5	6	...	52	53	54	55	...	56
7	...	8	9	10	11	.	57	58	59	..	60	61	62
12	13	14	15	.	16	17	63	...	64	65	66	67	...
18	19	...	20	21	22	23	68	69	70	71	...	72	73
...	24	25	26	27	...	28	74	75	...	76	77	78	79
29	30	31	.	32	33	34	.	80	81	82	83	..	84
35	...	36	37	38	39		85	86	87	...	88	89	90
40	41	42	43	...	44	45	91	.	92	93	94	95	...
46	47	...	48	49	50	51	96	97	98	99	...	.	...

Months in	**1**	**2**	**3**	**4**	**5**	**6**	**7** or **0**
Ordinary years.	Aug.	Feb. Mar. Nov.	June	Sep. Dec.	Apr. July	Jan. Oct.	May
Leap years	Feb.	...	...	...	Jan.	...	...

[*Example.—To find week-day of 26th Jan. 1844—*
Add 4 + 6 + 5 + 26 and divide the total 41 by 7. Remainder, 6 = Friday.]

Sūrya siddhānta constant

Year B.C. or A.D.	Kaliyuga	Commencement of solar year, month and date.	Fraction of day.	First new moon in solar year.	☾'s anomaly at commencement of solar year.
B.C.		**k**		**l**	**m**
3201	99	Feb. 14	·93235	17·34738	23·29064
3102	0	Feb. 15	·57924	2·17013	4·71797
3101	1	Feb. 15	·83800	20·80902	11·76692
3001	101	Feb. 16	·71365	24·27066	0·24311
2901	201	Feb. 17	·58930	27·73280	16·27888
2801	301	Feb 18	·46494	1·66335	4·75007
2701	401	Feb. 19	·34059	5·12499	20·78084
2601	501	Feb. 20	21624	8·58668	9·25708
2501	601	Feb 21	·09189	12·04827	25·28780
2401	701	Feb. 21	·96754	15·50991	13·76399
2301	801	Feb. 22	·84319	18·97155	2·24018
2201	901	Feb. 23	71888	22·43319	18·27095
2101	1001	Feb 24	59448	25·89488	6·74714
2001	1101	Feb. 25	·47013	29·35647	22·77791
1901	1201	Feb. 26	·34578	3·28752	11·25410
1801	1301	Feb. 27	·22143	6·74916	27·28487
1701	1401	Feb. 28	·09708	10·21080	15·76106
1601	1501	Feb. 28	·97273	13·67244	4·28725
1501	1601	Feb. 29	·84837	17·18408	20·26802
1401	1701	Mar. 1	·72402	20·59572	8·74421
1301	1801	Mar. 2	·59967	24·05736	24·77498
1201	1901	Mar. 3	·47532	27·51900	13·25111
1101	2001	Mar. 4	·35097	1·45005	1·72736

Year B.C. or A.D.	Kaliyuga	Commencement of solar year, month and date.
B.C.		**k**
1001	2101	Mar. 5
901	2201	Mar. 6
801	2301	Mar. 6
701	2401	Mar. 7
601	2501	Mar. 8
501	2601	Mar. 9
401	2701	Mar. 10
301	2801	Mar. 11
201	2901	Mar. 12
101	3001	Mar. 13
1	3101	Mar. 13
A.D.		
100	3201	Mar. 14
200	3301	Mar. 15
300	3401	Mar. 16
400	3501	Mar. 17
500	3601	Mar. 18
600	3701	Mar. 19
700	3801	Mar. 20
800	3901	Mar. 20
900	4001	Mar. 21
1000	4101	Mar. 22
1100	4201	Mar. 23
1200	4301	Mar. 24
1300	4401	Mar. 25
1400	4501	Mar. 26
1500	4601	Mar. 27
1600	4701	Mar. 27
1700	4801	Mar. 28
1800	4901	Apr. 10
1900	5001	Apr. 12

N.B.—Odd years in centuries B.C. should be converted into positive years before adding **n**, **o** or **p** to **k**, **l**, **m**. See examples on pages 118, 119.

SŪRYA SIDDHĀNTA.

the way in which they are to be used is shown in the specimen problems on reverse.

represent days and fractions of a day.

5 ..120°	6 ..150°	7 ..180°	8...210°	9...240°	10 ..270°	11 . 300°	12...330°	
Bhādrapada	Āśvina	Kārttika	Mārgaśīrsha	Pausha	Māgha	Phālguna	Chaitra	
Simha	Kanyā	Tulā	Vṛiśchika	Dhanus	Makara	Kumbha	Mīna	——
Āvaṇi	Puraṭṭāsi	Aippasi	Kārttigai	Mārgaḷi	Tai	Māśi	Pangunī	
123·4756	156·4942	186·9356	216·8289	246 3192	275·6369	305·0850	334 9053	365·2588
Aug. 16	Sep 16	Oct. 17	Nov 16	Dec. 15	Jan. 14	Feb. 12	Mar. 13	
(5) Bhādrapada	*(6) Āśvina*	*(7) Kārttika*	*(8) Mārgaśīrsha*	*(9) Pausha*	*(10) Māgha*	*(11) Phālguna*	*(12) Chaitra*	*(13) Chaitra when there is adhikamāsa*
118·1223	147 6530	177·1835	206 7141	236 2447	265·7758	295 3059	324·8365	354·3570
7·904	9 880	11·856	13·832	15·808	17 784	19 760	21 736	23·712

decimals of a day, and moon's anomalistic months.

6	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
5·9061	6·8905	7·8748	8 8592	9 8435	10 8379	11·8122	12 7966	13·7809	14 7653
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
20·6714	21·6558	22·6401	23·6245	24·6988	25 5932	26 5775	27·5619	28 5462	29·5306

Moon's anomalistic months.

1 month = 27 5545 days.
2 months = 55 1090 days
12 months = 330 6540.
13 months = 358·2085.

decimals of a day. (The signs – and + are to be applied to the equation in heavy type and not to the anomaly)

·21	**·22**	**·23**	**·24**	**·25**	**·26**	**·27**	**·28**	**·29**	**·30**	**·31**	**·32**	**33**	**·34**	**35**	**36**	**·37**	**·38**	**·39**	**·40**	**·41**	
2·53	2·67	2·80	2·94	3 08	3 23	3 38	3·53	3·69	3·85	4·01	4 19	4 37	4 56	4·76	4·98	5 21	5 48	5 78	6 14	6 70	**e For tithis.**
11·66	11 55	11·48	11·31	11 19	11·07	10 94	10 81	10 67	10 53	10 38	10 23	10·07	9 90	9 71	9·51	9 30	9·06	8 78	8 43	7 90	
15·89	16·00	16·12	16 24	16·36	16·49	16·61	16 75	16 88	17 03	17·17	17 33	17·49	17 66	17 81	18 03	18 25	18·49	18·77	19 12	19·65	
25·02	24·89	24·75	24 61	24·47	24·32	24·18	24·02	23·87	23·73	23 54	23 36	23 18	22·99	22 79	22·58	22 34	22 08	21 73	21 41	20·86	
2 74	2·89	3·04	3·20	3·36	3·52	3·69	3 87	4 05	4 24	4·44	4·65	4 88	5·13	5 40	5 72	6·11	6 73				**f For nakshatras.**
11 45	11·32	11·19	11·06	10·92	10·77	10·62	10·47	10 31	10 14	9·95	9·77	9 56	9·33	9 07	8·78	8 41	7 81				
16 10	16·23	16·36	16 50	16 64	16·78	16·93	17·09	17 25	17 42	17 60	17 79	18·00	18·22	18·48	18 78	19 15	19·74				
24·81	24·66	24·51	24·35	24 19	24 03	23 86	23·68	23·50	23 32	23 11	22·90	22 68	22 43	22 15	21·83	21 44	20·83				
2·96	3·13	3·30	3·47	3·65	3·84	4·03	4 24	4 46	4·68	4·93	5·20	5·52	5 90	6·42							**g For yogas**
11·23	11·09	10·94	10·78	10 62	10·45	10·28	9 10	9·90	9 69	9 46	9·21	8 92	8 56	8 06							
16·32	16·46	16·61	16·77	16·93	17·10	17 27	77 46	17·67	17 86	18·09	18·34	18·63	18·99	19 49							
25 59	24·43	24·26	24·08	23 90	23 71	23·52	23·31	23·09	22·87	22 62	22·35	22·04	21·66	21 16							

year and decimals of a day. (The anomalies are entered in ordinary type and the equations, with appropriate signs, in heavy type.)

+ ·01	**·00**	**– ·01**	**– ·02**	**– ·03**	**– ·04**	**– ·05**	**– 06**	**– 07**	**– ·08**	**– ·09**	**– 10**	**– 11**	**– ·12**	**– ·13**	**– ·14**	**– ·15**	**– ·16**	**– 17**	**– 175**	**– 18**
77	80·5	84	87	90	93·5	97	100	103	107	111	115	119	123	128	132	138	145	154	160	168
266	263	260	257	254	250	247	244	240	237	233	229	225	221	216	211	206	199	190	183	176
– ·02	**– ·01**	**– ·00**	**+ ·01**	**+ ·02**	**+ ·03**	**+ ·04**	**+ ·05**	**+ ·06**	**+ ·07**	**+ ·08**	**+ ·09**	**+ ·10**	**+ ·11**	**+ 12**	**+ ·13**	**+ ·14**	**+ ·15**	**+ ·153**	**+ ·154**	
73	77	80·55	84	88	92	96	99	103	108	112	116	121	126	132	139	147	159	167	171·71	
271	267	263·18	259	256	252	248	241	240	236	232	227	222	217	211	205	197	185	177	171·71	

for centuries.

Fraction of day.	First new moon in solar year.	☾'s anomaly at commencement of solar year.
	l	m
·22662	4·91229	17 75813
·10226	8·37393	6·23432
·97791	11·83557	22·26509
·85356	15·29721	10·74128
·72921	18·75885	26·77205
·60486	22·22049	15·24824
·48051	25·68213	3·72448
·35615	29·14377	19·75520
·23180	3·07482	8·23139
·10745	6·53646	24·26216
·98310	9·99810	12·73835
·85875	13·45974	1·21454
·73440	16·92138	17·24532
·61004	20·38802	5·72151
·48569	23·84466	21·75228
·36184	27·30630	10·22845
·23698	1·23785	26·25922
·11264	4·69899	14·73539
·98828	8·16063	3·21156
·86393	11·62227	19·24233
·73958	15·08391	7·71850
·61523	18·54556	23·74927
·49088	22·00720	12·22544
·36652	25·46884	0·70161
·24217	28·93048	16·73238
·11782	2·36138	5·20855
·99347	6·32817	21·35937
·86912	9·78481	9·83810
·74477	13·24645	25·87144
·62041	16·70809	14·35017

Sūrya siddhānta—Odd years.

	Fraction of day, marking commencement of solar year.	First new moon in solar year.	☾'s anomaly for beginning of solar year.		Fraction of day, marking commencement of solar year.	First new moon in solar year.	☾'s anomaly for beginning of solar year.		Fraction of day, marking commencement of solar year.	First new moon in solar year.	☾'s anomaly for beginning of solar year.
	n	o	p		n	o	p		n	o	p
1	·25876	18·63889	7·04896	**38**	·83274	29·07418	19·86899	**75**	1·40673	9·97888	5·18448
2	·51751	7·74719	14·09791	**39**	1·09150	18·18247	26·91795	**76**	·66549	28·61776	12·18839
3	·77627	26 38607	21·14687	**40**	·35026	7·29077	6·41231	**77**	·92424	17·72606	19 23285
4	·03502	15·49437	0·64123	**41**	·60901	25·92966	13·46127	**78**	1·18300	6 83486	26 28180
5	·29378	4·60267	7·69019	**42**	·86777	15·03796	20 51022	**79**	1·44176	25 47325	5·77566
6	·55254	23·24156	14·73915	**43**	1·12652	4·14626	0 00458	**80**	·70051	14·58155	12·82462
7	81129	12·34986	21·78810	**44**	·38528	22·78515	7·05354	**81**	·95927	3 68985	19·87358
8	·07005	1·45815	1·28246	**45**	·64404	11·89344	14·10250	**82**	1·21802	22·32873	26·92253
9	·32881	20·09704	8·33142	**46**	·90279	1·00174	21·15146	**83**	1·47678	11·43703	6·41689
10	·58756	9·20534	15·38038	**47**	1·16155	19·64063	0·64581	**84**	·73554	0·54583	13·46585
11	·84632	27·84423	22·42933	**48**	·42031	8·74893	7·69477	**85**	·99430	19·18422	20·51481
12	·10508	16·95253	1·92369	**49**	·67906	27·38782	14·74873	**86**	1·25305	8·29252	0·00917
13	·36883	6·06082	8·97265	**50**	·93782	16 49611	21·79269	**87**	1·51181	26·93140	7·05812
14	·62259	24·69971	16·02161	**51**	1·19658	5·60441	1·28704	**88**	·77056	16·03970	14 10708
15	·88135	13·80801	23·07057	**52**	·45533	24·24330	8 33600	**89**	1·02932	5·14800	21·15604
16	·14010	2·91631	2·56492	**53**	·71409	13·35160	15·38496	**90**	1·28808	23·78689	0·65040
17	·39886	21·55520	9·61388	**54**	·97284	2·45990	22·48392	**91**	1·54683	12·89519	7·69985
18	·65761	10·66850	16·66284	**55**	1·23160	21·09878	1·92828	**92**	·80559	2·00349	14·74881
19	·91637	29·80238	23·71180	**56**	·49036	10·20708	8 97723	**93**	1·06434	20·64237	21 79727
20	·17513	18·41068	3·20615	**57**	·74911	28·84597	16·02619	**94**	1·32310	9·75067	1·29163
21	·43388	7·51898	10·25511	**58**	1·00787	17·95420	28·07515	**95**	1·58186	28·88956	8·34059
22	·69264	26·15787	17·30407	**59**	1·26663	7 06257	2·56951	**96**	·84061	17·49786	15·38954
23	·95140	15·26616	24·35303	**60**	·52538	25·70146	9·61846	**97**	1·09937	6·60616	22·43850
24	·21015	4·37446	3·84739	**61**	·78414	14·80976	16·66742	**98**	1·35813	25·24504	1·93286
25	·46891	23·01335	10·89634	**62**	1·04290	3 91805	23·71638	**99**	1·61688	14·35334	8·98182
26	·72767	12·12165	17·94530	**63**	1·30165	22·55694	8·21074	**100**	·87565	3·46164	16·08078
27	·98642	1·22995	24·99426	**64**	·56041	11·66524	10 25970	**200**	·75130	6·92328	4·50696
28	·24518	19·86884	4·48862	**65**	·81917	0·77854	17·30865	**300**	·62694	10·38492	20·53775
29	·50393	8·97713	11·53757	**66**	1·07792	19·41242	24·35761	**400**	·50259	13·84657	9·01898
30	·76269	27·61602	18·58653	**67**	1·33668	8 52078	3·85197	**500**	·37824	17·30821	25·04471
31	1·02145	16·72432	25·63549	**68**	·59543	27·15961	10·90093	**600**	·25389	20·76985	13·52089
32	·28020	5·83262	5·12985	**69**	·85419	16·26791	17·94988	**700**	·12954	24·23149	1·99708
33	·53896	24 47151	12·17881	**70**	1·11295	5·37621	24·99884	**800**	·00519	27·69812	18·02786
34	·79772	13·57981	19·22776	**71**	1·37170	24·01509	4·49320	**900**	·88084	1·62418	6·50404
35	1·05647	2·68810	26·27672	**72**	·63046	13·12339	11·54216	**1000**	·75648	5·08582	22·53482
36	·31523	21·32699	5·77108	**73**	·88922	2·23169	18·59112	**2000**	·51297	10·17164	17·51504
37	·57399	10·43529	12·82004	**74**	1·14797	20·87058	25·64007	**3000**	·26946	15·25746	12·49527

q Days counted from March 1

	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sep. 1	Oct. 1	Nov. 1	Dec. 1	Jan. 1	Feb. 1	Mar. 1
March	... 1	32	62	93	123	154	185	215	246	276	307	338	...

r Ghaṭikas	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Fraction of day ..	·0167	·0333	·0500	·0667	·0833	·1000	·1167	·1333	·1500	·1667	·1833	·2000	·2167	·2333
Ghaṭikas ...	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**
Fraction of day ...	·5167	·5333	·5500	·5667	·5833	·6000	·6167	·6333	·6500	·6667	·6833	·7000	·7167	·7333
Palas .	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**15**	**17**	**20**
Fraction of day	·0003	·0005	·0008	·0011	·0014	·0017	·0019	·0022	·0025	·0028	·0033	·0042	·0047	·0055

NAKSHA

s Shortest interval in days from new moon to ending

Longitude at commencement. Deg.	Min.	Order	Names of nakshatras.	Days.	Order	Ordinarily Vaiśākha I	Order	Ordinarily Jyeshṭha II	Order	Ordinarily Āshāḍha III	Order	Ordinarily Śrāvaṇa IV	Order	Ordinarily Bhādrapada V	Order	Ordinarily Āśvina VI	Order	Ordinarily Kārttika VII
		27	Revatī		**3**	0·9892	**5**	0·8041	**7**	0·6190	**9**	0·4339	**11**	0·2488	**13**	0·0638	**16**	0·8906
0	0	**1**	Aśvinī	1·0119	**4**	2·0011	**6**	1·8160	**8**	1·6309	**10**	1·4458	**12**	1·2608	**14**	1·0757	**17**	1·9025
13	20	**2**	Bharaṇī	2·0238	**5**	3·0130	**7**	2·8279	**9**	2·6428	**11**	2·4578	**13**	2·2727	**15**	2·0876	**18**	2·9144
26	40	**3**	Kṛittikā	3·0357	**6**	4·0249	**8**	3·8398	**10**	3·6548	**12**	3·4697	**14**	3·2846	**16**	3·0995	**19**	3·9263
40	0	**4**	Rohiṇī	4·0476	**7**	5·0368	**9**	4·8518	**11**	4·6667	**13**	4·4816	**15**	4·2965	**17**	4·1114	**20**	4·9382
53	20	**5**	Mṛigaśira	5·0596	**8**	6·0488	**10**	5·8637	**12**	5·6786	**14**	5·4935	**16**	5·3084	**18**	5·1233	**21**	5·9502
66	40	**6**	Ardrā	6·0715	**9**	7·0607	**11**	6·8756	**13**	6·6905	**15**	6·5054	**17**	6·3203	**19**	6·1352	**22**	6·9621
80	0	**7**	Punarvasu	7·0834	**10**	8·0726	**12**	7·8875	**14**	7·7024	**16**	7·5173	**18**	7·3322	**20**	7·1472	**23**	7·9740
93	20	**8**	Pushya	8·0953	**11**	9·0845	**13**	8·8994	**15**	8·7143	**17**	8·5292	**19**	8·3442	**21**	8·1591	**24**	8·9859
106	40	**9**	Aśleshā	9·1072	**12**	10·0964	**14**	9·9113	**16**	9·7262	**18**	9·5412	**20**	9·3561	**22**	9·1710	**25**	9·9978
120	0	**10**	Maghā	10·1191	**13**	11·1083	**15**	10·9232	**17**	10·7382	**19**	10·5531	**21**	10·3680	**23**	10·1829	**26**	11·0097
133	20	**11**	Pūrva Phalgunī ...	11·1310	**14**	12·1202	**16**	11·9352	**18**	11·7501	**20**	11·5650	**22**	11·3799	**24**	11·1948	**27**	12·0216
146	40	**12**	Uttara Phalgunī ...	12·143	**15**	13·1322	**17**	12·9471	**19**	12·7620	**21**	12·5769	**23**	12·3918	**25**	12·2067	**1**	13·0336
160	0	**13**	Hasta	13·1549	**16**	14·1441	**18**	13·9590	**20**	13·7739	**22**	13·5888	**24**	13·4037	**26**	13·2186	**2**	14·0455
173	20	**14**	Chitrā...	14·1668	**17**	15·1560	**19**	14·9709	**21**	14·7858	**23**	14·6007	**25**	14·4156	**27**	14·2306	**3**	15·0574
186	40	**15**	Svāti	15·1787	**18**	16·1679	**20**	15·9828	**22**	15·7977	**24**	15·6126	**26**	15·4276	**1**	15·2425	**4**	16·0693
200	0	**16**	Viśākhā	16·1906	**19**	17·1798	**21**	16·9947	**23**	16·8096	**25**	16·6246	**27**	16·4395	**2**	16·2544	**5**	17·0812
213	20	**17**	Anurādhā	17·2027	**20**	18·1917	**22**	18·0066	**24**	17·8216	**26**	17·6365	**1**	17·4514	**3**	17·2663	**6**	18·0931
226	40	**18**	Jyeshṭhā	18·2144	**21**	19·2036	**23**	19·0186	**25**	18·8335	**27**	18·6484	**2**	18·4633	**4**	18·2782	**7**	19·1050
240	0	**19**	Mūla	19·2264	**22**	20·2156	**24**	20·0305	**26**	19·8454	**1**	19·6603	**3**	19·4752	**5**	19·2901	**8**	20·1169
253	20	**20**	Pūrva-Āshāḍhā ...	20·2083	**23**	21·2275	**25**	21·0424	**27**	20·8573	**2**	20·6722	**4**	20·4871	**6**	20·3020	**9**	21·1289
266	40	**21**	Uttara-Āshāḍhā ...	21·2502	**24**	22·2394	**26**	22·0543	**1**	21·8692	**3**	21·6841	**5**	21·4990	**7**	21·3139	**10**	22·1408
280	0	**22**	Śrāvaṇa	22·2621	**25**	23·2513	**27**	23·0662	**2**	22·8811	**4**	22·6960	**6**	22·5109	**8**	22·3259	**11**	23·1527
293	20	**23**	Sravishṭha	23·2740	**26**	24·2632	**1**	24·0781	**3**	23·8930	**5**	23·7079	**7**	23·5229	**9**	23·3378	**12**	24·1646
306	40	**24**	Śatabhishaj	24·2859	**27**	25·2751	**2**	25·0900	**4**	24·9049	**6**	24·7199	**8**	24·5348	**10**	24·3497	**13**	25·1765
320	0	**25**	Pūrva-Bhādrapadā ...	25·2978	**1**	26·2870	**3**	26·1019	**5**	25·9169	**7**	25·7318	**9**	25·5467	**11**	25·3616	**14**	26·1884
333	20	**26**	Uttara-Bhādrapadā...	26·3098	**2**	27·2990	**4**	27·1139	**6**	26·9288	**8**	26·7437	**10**	26·5586	**12**	26·3735	**15**	27·2003
346	40	**27**	Revatī	27·3217	**3**	28·3109	**5**	28·1258	**7**	27·9407	**9**	27·7556	**11**	27·5705	**13**	27·3854	**16**	28·2123
					4	29·3228	**6**	29·1877	**8**	28·9526	**10**	28·7675	**12**	28·5824	**14**	28·3973	**17**	29·2242
															15	29·4098		

YOGAS

v Shortest interval in days from new moon to

Longitude at commencement. Deg.	Min.	Order	Names of yogas.	Days.	Order	Ordinarily Vaiśākha	Order	Ordinarily Jyeshṭha	Order	Ordinarily Āshāḍha	Order	Ordinarily Śrāvaṇa	Order	Ordinarily Bhādrapada	Order	Ordinarily Āśvina	Order	Ordinarily Kārttika
		27	Vaidhṛiti	...	**5**	0·8992	**9**	0·5548	**13**	0·2104	**18**	0·8075	**22**	0·4631	**26**	0·1187	**4**	0·7157
0	0	**1**	Vishkamba	0·9415	**6**	1·8407	**10**	1·4963	**14**	1·1519	**19**	1·7490	**23**	1·4046	**27**	1·0601	**5**	1·6572
13	20	**2**	Prīti	1·8830	**7**	2·7822	**11**	2·4378	**15**	2·0934	**20**	2·6905	**24**	2·3460	**1**	2·0016	**6**	2·5987
26	40	**3**	Āyushmat ..	2·8245	**8**	3·7237	**12**	3·3793	**16**	3·0349	**21**	3·6319	**25**	3·2875	**2**	2·9431	**7**	3·5402
40	0	**4**	Saubhāgya	3·7660	**9**	4·6652	**13**	4·3208	**17**	3·9763	**22**	4·5734	**26**	4·2290	**3**	3·8846	**8**	4·4817
53	20	**5**	Śobhana	4·7074	**10**	5·6067	**14**	5·2622	**18**	4·9178	**23**	5·5149	**27**	5·1705	**4**	4·8261	**9**	5·4232
66	40	**6**	Atigaṇḍa	5·6489	**11**	6·5482	**15**	6·2037	**19**	5·8593	**24**	6·4564	**1**	6·1120	**5**	5·7676	**10**	6·3647
80	0	**7**	Sukarman	6·5904	**12**	7·4896	**16**	7·1452	**20**	6·8008	**25**	7·3979	**2**	7·0535	**6**	6·7091	**11**	7·3062
93	20	**8**	Dhṛiti	7·5319	**13**	8·4311	**17**	8·0867	**21**	7·7423	**26**	8·3394	**3**	7·9950	**7**	7·6506	**12**	8·2477
106	40	**9**	Śūla	8·4734	**14**	9·3726	**18**	9·0282	**22**	8·6838	**27**	9·2809	**4**	8·9365	**8**	8·5921	**13**	9·1391
120	0	**10**	Gaṇḍa	9·4149	**15**	10·3141	**19**	9·9697	**23**	9·6253	**1**	10·2224	**5**	9·8780	**9**	9·5335	**14**	10·1306
133	20	**11**	Vṛiddhi	10·3564	**16**	11·2556	**20**	10·9112	**24**	10·5668	**2**	11·1639	**6**	10·8195	**10**	10·4750	**15**	11·0721
146	40	**12**	Dhruva	11·2979	**17**	12·1971	**21**	11·8527	**25**	11·5083	**3**	12·1053	**7**	11·7609	**11**	11·4165	**16**	12·0136
160	0	**13**	Vyāghāta	12·2394	**18**	13·1386	**22**	12·7942	**26**	12·4498	**4**	13·0468	**8**	12·7024	**12**	12·3580	**17**	12·9551
173	20	**14**	Harshaṇa	13·1808	**19**	14·0801	**23**	13·7357	**27**	13·3912	**5**	13·9883	**9**	13·6439	**13**	13·2995	**18**	13·8966
186	40	**15**	Vajra	14·1223	**20**	15·0216	**24**	14·6771	**1**	14·3327	**6**	14·9298	**10**	14·5854	**14**	14·2410	**19**	14·8381
200	0	**16**	Siddhi	15·0638	**21**	15·9630	**25**	15·6186	**2**	15·2742	**7**	15·8713	**11**	15·5269	**15**	15·1825	**20**	15·7796
213	20	**17**	Vyatīpāta	16·0053	**22**	16·9045	**26**	16·5601	**3**	16·2157	**8**	16·8128	**12**	16·4684	**16**	16·1240	**21**	16·7211
226	40	**18**	Variyas	16·9468	**23**	17·8460	**27**	17·5016	**4**	17·1572	**9**	17·7543	**13**	17·4009	**17**	17·0655	**22**	17·0825
240	0	**19**	Parigha	17·8883	**24**	18·7875	**1**	18·4431	**5**	18·0087	**10**	18·6958	**14**	18·3514	**18**	18·0070	**23**	18·6040
253	20	**20**	Śiva	18·8298	**25**	19·7290	**2**	19·3846	**6**	19·6402	**11**	19·6373	**15**	19·2929	**19**	18·9484	**24**	19·5455
266	40	**21**	Siddha	19·7713	**26**	20·6705	**3**	20·3261	**7**	19·9817	**12**	20·5788	**16**	20·2343	**20**	19·8899	**25**	20·4870
280	0	**22**	Sādhya	20·7128	**27**	21·6120	**4**	21·2676	**8**	20·9232	**13**	21·5302	**17**	21·1758	**21**	20·8314	**26**	21·4285
293	20	**23**	Śubha	21·6543	**1**	22·5535	**5**	22·2091	**9**	21·8647	**14**	22·4617	**18**	22·1173	**22**	21·7729	**27**	22·3700
306	40	**24**	Śukla	22·5957	**2**	23·4950	**6**	23·1506	**10**	22·8061	**15**	23·4032	**19**	23·0588	**23**	22·7144	**1**	23·3115
320	0	**25**	Brahman	23·5872	**3**	24·4365	**7**	24·0920	**11**	23·7476	**16**	24·3447	**20**	24·0008	**24**	23·6559	**2**	24·2530
333	20	**26**	Indra	24·4787	**4**	25·3779	**8**	25·0335	**12**	24·6891	**17**	25·2862	**21**	24·9418	**25**	24·5974	**3**	25·1945
346	40	**27**	Vaidhṛiti	25·4202	**5**	26·3194	**9**	25·9750	**13**	25·6306	**18**	26·2277	**22**	25·8833	**26**	25·5389	**4**	26·1360
					6	27·2609	**10**	26·9165	**14**	26·5721	**19**	27·1692	**23**	26·8248	**27**	26·4804	**5**	27·0774
					7	28·2024	**11**	27·8580	**15**	27·5136	**20**	28·1107	**24**	27·7663	**1**	27·4219	**6**	28·0189
					8	29·1439	**12**	28·7995	**16**	28·4551	**21**	29·0522	**25**	28·7078	**2**	28·3638	**7**	28·9604
									17	29·3966					**3**	29·3048		

q Days counted from April 1

	Apr. 1	May 1	June 1	July 1	Aug. 1	Sep. 1	Oct. 1	Nov. 1	Dec 1	Jan. 1	Feb. 1	Mar. 1
April ...	1	31	62	92	123	154	184	215	245	276	307	335

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15	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
·2500	·2667	·2833	·3000	·3167	·3333	·3500	·3667	·3833	·4000	4167	·4333	·4500	·4667	·4833	·5000
45	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
·7500	·7667	·7833	·8000	·8167	·8333	·8500	8667	·8833	·9000	·9167	·9333	9500	·9667	·9833	1·0000
22	**25**	**27**	**30**	**32**	**35**	**37**	**40**	**42**	**45**	**47**	**50**	**52**	**55**	**57**	**60**
·0061	·0069	·0076	·0083	·0089	·0097	·0103	0111	·0117	0125	·0130	·0139	·0144	·0153	·0158	·0167

TRAS.

moment of each nakshatra

Order	Ordinarily Mārgaśirsha.	Order	Ordinarily Pausha	Order	Ordinarily Māgha	Order	Ordinarily Phālguna	Order	Chaitra, when no Adhika Masa.	Order	Chaitra when there is Adhika Masa
	VIII		**IX**		**X**		**XI**		**XII**		**XIII**
18	0·7055	**20**	0 5204	**22**	0·3353	**24**	0·1502	**27**	0·9771	**2**	0·7920
19	1·7174	**21**	1·5823	**23**	1·3472	**25**	1 1622	**1**	1·9890	**3**	1·8039
20	2,7293	**22**	2·5442	**24**	2·3592	**26**	2·1741	**2**	3·0009	**4**	2·8158
21	3·7412	**23**	3·5562	**25**	3 3711	**27**	3·1860	**3**	4·0128	**5**	3 8277
22	4·7532	**24**	4·5681	**26**	4 3830	**1**	4 1979	**4**	5·0247	**6**	4·8396
23	5·7651	**25**	5·5800	**27**	5·3949	**2**	5·2098	**5**	6·0366	**7**	5·8516
24	6·7770	**26**	6·5919	**1**	6·4068	**3**	6 2217	**6**	7·0486	**8**	6 8635
25	7·7889	**27**	7·6038	**2**	7·4187	**4**	7·2336	**7**	8·0605	**9**	7·8754
26	8·8008	**1**	8·6157	**3**	8·4306	**5**	8·2456	**8**	9 0724	**10**	8 8878
27	9 8127	**2**	9·6276	**4**	9·4426	**6**	9 2575	**9**	10·0843	**11**	9 8992
1	10·8246	**3**	10·6396	**5**	10 4545	**7**	10·2694	**10**	11 0962	**12**	10·9111
2	11·8366	**4**	11·6515	**6**	11·4664	**8**	11 2813	**11**	12·1081	**13**	11·9230
3	12·8485	**5**	12·6634	**7**	12 4783	**9**	12 2932	**12**	13 1200	**14**	12·9350
4	13·8604	**6**	13·6753	**8**	13 4902	**10**	13·3051	**13**	14 1320	**15**	13 9469
5	14.8723	**7**	14·6872	**9**	14 5021	**11**	14·3170	**14**	15 1439	**16**	14·9588
6	15·8842	**8**	15 6991	**10**	15·5140	**12**	15 3290	**15**	16·1558	**17**	15 9707
7	16·8961	**9**	16·7110	**11**	16·5260	**13**	16·3409	**16**	17·1677	**18**	16·9826
8	17·9080	**10**	17·7230	**12**	17·5379	**14**	17 3528	**17**	18·1796	**19**	17·9945
9	18·9199	**11**	18·7349	**13**	18·5498	**15**	18·3647	**18**	19 1915	**20**	19·0064
10	19·9319	**12**	19 7468	**14**	19 5617	**16**	19·3766	**19**	20·2034	**21**	20 0183
11	20·9438	**13**	20·7587	**15**	20·5736	**17**	20 3885	**20**	21·2153	**22**	21·0303
12	21·9557	**14**	21·7706	**16**	21·5855	**18**	21·4004	**21**	22 2278	**23**	22·0422
13	22·9676	**15**	22·7825	**17**	22·5974	**19**	22·4124	**22**	23·2392	**24**	23·0541
14	23 9795	**16**	23·7944	**18**	23·6094	**20**	23·4243	**23**	24 2511	**25**	24·0660
15	24 9914	**17**	24·8064	**19**	24·6213	**21**	24·4362	**24**	25·2630	**26**	25·0779
16	26·0033	**18**	25·1883	**20**	25·6332	**22**	25·4481	**25**	26·2749	**27**	26 0898
17	27·0153	**19**	26·8302	**21**	26·6451	**23**	26·4600	**26**	27 2868	**1**	27·1017
18	28·0272	**20**	27·8421	**22**	27·6570	**24**	27·4719	**27**	28·2987	**2**	28 1137
19	29·0391	**21**	28 8540	**23**	28 6689	**25**	28·4838	**1**	29·3107	**3**	29·1256
						26	29 4957				

Annual correction.

Argument:—Date of appearance of 1st new moon in each solar year according to Table X.

The correction corresponding to the decimal portion of the argument should be subtracted from the nakshatra or yoga correction corresponding to the integral portion; thus the nakshatra correction corresponding to an argument 28·53 = 0·11 *minus* 04 = 0·07.

NAKSHATRAS.

Arg.	Corrn. t	Arg.	Corrn. u	Arg.	Corrn. u	Arg.	Corrn. u	Arg.	Corrn. u
0	2 20890	**01**	·00075	**30**	·02244	**·59**	·04413	**·88**	·06582
1	2 13410	**·02**	·00150	**·31**	·02319	**·60**	04488	**·89**	·06657
2	2·05930	**·03**	·00224	**·32**	·02394	**·61**	·04563	**·90**	·06732
3	1 98450	**·04**	·00299	**·33**	·02468	**62**	·04638	**91**	·06807
4	1·90970	**·05**	·00374	**·34**	02543	**·63**	·04712	**·92**	06882
5	1·83490	**·06**	·00449	**·35**	02618	**64**	·04787	**·93**	·06956
6	1·76010	**·07**	·00524	**·36**	·02693	**·65**	04862	**94**	·07031
7	1·68531	**·08**	·00598	**·37**	·02768	**66**	·04937	**·95**	07106
8	1 61049	**09**	·00673	**·38**	02842	**67**	05012	**96**	07181
9	1·53569	**10**	·00748	**39**	02917	**·68**	·05086	**·97**	·07256
10	1 46089	**11**	·00823	**·40**	02992	**·69**	·05161	**·98**	·07330
11	1·38609	**·12**	·00898	**·41**	·03067	**70**	·05236	**·99**	·07405
12	1 31129	**·13**	·00972	**·42**	·03142	**·71**	·05311		
13	1 23649	**14**	·01047	**43**	·03216	**·72**	·05386		
14	1·16169	**·15**	01122	**·44**	·03291	**73**	·05460		
15	1 08689	**·16**	01197	**·45**	03366	**74**	·05535		
16	1·01209	**·17**	01272	**46**	·03441	**·75**	·05610		
17	0 93729	**·18**	01346	**·47**	·03516	**·76**	·05685		
18	0·86249	**·19**	01421	**·48**	03590	**77**	·05760		
19	0·78769	**·20**	·01496	**·49**	03665	**·78**	·05834		
20	0·71288	**·21**	·01571	**.50**	·03740	**·79**	·05909		
21	0 63808	**·22**	·01646	**51**	03815	**·80**	05984		
22	0 56328	**·23**	·01720	**·52**	·03890	**·81**	·06059		
23	0·48848	**·24**	·01795	**·53**	·03964	**·82**	·06134		
24	0·41368	**·25**	·01870	**·54**	·04039	**·83**	·06208		
25	0·33888	**·26**	·01945	**·55**	·04114	**·84**	06283		
26	0·26408	**·27**	·02020	**56**	·04189	**·85**	·06358		
27	0·18928	**·28**	·02094	**·57**	04264	**·86**	·06433		
28	0·11448	**29**	·02169	**·58**	·04338	**·87**	·06508		
29	0 03968								

ending moment of each yoga.

Order	Ordinarily Mārgaśirsha	Order	Ordinarily Pausha	Order	Ordinarily Māgha	Order	Ordinarily Phālguna	Order	Chaitra, when no Adhika Masa	Order	Chaitra when there is Adhika Masa
8	0·3713	**12**	0·0269	**17**	0·6240	**21**	0·2796	**26**	0·8767	**3**	0·5323
9	1·3128	**13**	0·9684	**18**	1·5655	**22**	1·2211	**27**	1·8182	**4**	1·4737
10	2·2543	**14**	1·9099	**19**	2 5070	**23**	2 1626	**1**	2·7596	**5**	2·4152
11	3·1958	**15**	2·8514	**20**	3 4485	**24**	3·1041	**2**	3·7011	**6**	3 3567
12	4·1373	**16**	3·7929	**21**	4·3900	**25**	4·0455	**3**	4·6426	**7**	4·2982
13	5·0788	**17**	4·7344	**22**	5·3314	**26**	4·9870	**4**	5 5841	**8**	5·2397
14	6·0203	**18**	5·6759	**23**	6·2729	**27**	5·9285	**5**	6·5256	**9**	6 1812
15	6·9618	**19**	6·6173	**24**	7·2144	**1**	6·8700	**6**	7·4671	**10**	7·1227
16	7·9032	**20**	7·5588	**25**	8·1559	**2**	7·8115	**7**	8.4086	**11**	8·0642
17	8·8447	**21**	8·5003	**26**	9·0974	**3**	8·7530	**8**	9·3501	**12**	9·0057
18	9·7862	**22**	9·4418	**27**	10·0389	**4**	9·6945	**9**	10 2916	**13**	9·9472
19	10·7277	**23**	10·833	**1**	10·9804	**5**	10·6360	**10**	11 2331	**14**	10 8886
20	11·6692	**24**	11·3248	**2**	11·9219	**6**	11·5775	**11**	12·1745	**15**	11·8301
21	12·6107	**25**	12·2663	**3**	12·8634	**7**	12·5190	**12**	13 1160	**16**	12·7716
22	13·5522	**26**	13·2078	**4**	13 8048	**8**	13·4604	**13**	14·0575	**17**	13·7131
23	14·4937	**27**	14·1493	**5**	14·7463	**9**	14·4019	**14**	14·9990	**18**	14·6546
24	15·4352	**1**	15·0907	**6**	15·6878	**10**	15·3434	**15**	15·9405	**19**	15·5961
25	16·3766	**2**	16·0322	**7**	16·6293	**11**	16·2849	**16**	16 8820	**20**	16·5376
26	17·3181	**3**	16·9737	**8**	17·5708	**12**	17·2264	**17**	17·8235	**21**	17 4791
27	18·2596	**4**	17·9152	**9**	18·5123	**13**	18·1679	**18**	18·7650	**22**	18·4206
1	19·2011	**5**	18·8567	**10**	19·4538	**14**	19·1094	**19**	19·7065	**23**	19·8621
2	20·1426	**6**	19·7982	**11**	20·3953	**15**	20·0509	**20**	20·6479	**24**	20·8035
3	21·0841	**7**	20·7397	**12**	21·3368	**16**	20·9924	**21**	21·5894	**25**	21·2450
4	22·0256	**8**	21·6812	**13**	22·2783	**17**	21·9338	**22**	22·5309	**26**	22·1865
5	22·9671	**9**	22·6227	**14**	23·2197	**18**	22·8753	**23**	23·4724	**27**	23·1280
6	23·9086	**10**	23·5642	**15**	24·1612	**19**	23·8168	**24**	24·4134	**1**	24·0695
7	24·8501	**11**	24·5056	**16**	25·1027	**20**	24·7583	**25**	25 3554	**2**	25·0110
8	25·7915	**12**	25·4471	**17**	26 0442	**21**	25·6998	**26**	26·2969	**3**	25·9525
9	26·7330	**13**	26·3886	**18**	26·9857	**22**	26 6413	**27**	27·2384	**4**	26·8940
10	37·6745	**14**	27·3301	**19**	27·9272	**23**	27·5828	**1**	28·1799	**5**	27·8355
11	28·6160	**15**	28·2716	**20**	28·8687	**24**	28·5243	**2**	29·1214	**6**	28·7769
		16	29·2181			**25**	29·4658				

YOGAS.

See note on ANNUAL CORRECTION *supra*.

Arg.	w	Arg.	x	Arg.	x	Arg.	x	Arg.	x
0	4 11036	**01**	·00139	**·30**	·04176	**·59**	·08212	**·88**	·12249
1	3·97117	**·02**	·00278	**·31**	·04315	**·60**	·08351	**·89**	·12388
2	3·83198	**03**	·00417	**·32**	·04454	**·61**	08491	**·90**	12527
3	3 69279	**·04**	00557	**·33**	·04593	**·62**	·08630	**·91**	·12666
4	3·55360	**·05**	00696	**·34**	·04732	**·63**	·08769	**·92**	·12805
5	3·41441	**06**	·00835	**35**	04872	**·64**	08908	**·93**	·12945
6	3 27522	**·07**	·00974	**·36**	·05011	**65**	·09047	**·94**	·13084
7	3·13603	**·08**	·01113	**·37**	05150	**·66**	·09186	**·95**	·13223
8	2·99684	**·09**	·01253	**·38**	·05289	**·67**	·09326	**·96**	·13362
9	2·85765	**·10**	01392	**·39**	·05428	**68**	·09465	**·97**	·13501
10	2·71846	**·11**	·01530	**·40**	05568	**·69**	09604	**·98**	·13641
11	2 57927	**·12**	·01670	**·41**	·05707	**·70**	·09743	**·99**	·13780
12	2·44008	**·13**	·01809	**·42**	05846	**·71**	·09882		
13	2 30089	**·14**	·01949	**·43**	·05985	**·72**	·10022		
14	2·16170	**·15**	02088	**·44**	·06124	**·73**	·10161		
15	2·02251	**·16**	·02227	**·45**	·06263	**·74**	·10300		
16	1·88332	**·17**	·02366	**·46**	·06403	**·75**	·10439		
17	1·74413	**·18**	·02505	**·47**	·06542	**·76**	·10578		
18	1·60494	**·19**	·02645	**·48**	·06681	**·77**	·10798		
19	1·46575	**·20**	·02784	**·49**	·06820	**·78**	·10851		
20	1·32656	**·21**	·02923	**·50**	·06959	**·79**	·10996		
21	1·18737	**22**	·03068	**·51**	·07098	**·80**	·11135		
22	1·04818	**·23**	·03201	**·52**	·07238	**·81**	·11274		
23	0·90899	**·24**	·03340	**·53**	·07377	**·82**	·11413		
24	0·76980	**·25**	·03480	**54**	·07516	**·83**	·11553		
25	0 63061	**·26**	·03619	**·55**	·07655	**·84**	·11692		
26	0·49142	**·27**	·03758	**·56**	·07795	**·85**	·11831		
27	0·35223	**·28**	·03897	**·57**	·07934	**·86**	·11970		
28	0·21304	**·29**	·04036	**·58**	·08073	**·87**	·12108		
29	0·07385								

y Calendar to be used with Table II, as directed in specimen problems, for ascertaining the A.D. month and day corresponding to any solar date, lunar tithi, nakshatra, yoga or karana.

Vaiśākha.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
0	·9843	1	0·984
1	·9687	2	1·969
2	·9530	3	2·953
3	·9374	4	3·937
4	·9217	5	4·921
5	·9061	6	5·906
6	·8904	7	6·890
7	·8748	8	7·875
8	·8592	9	8·859
9	·8435	10	9·843
10	·8279	11	10·827
11	·8122	12	11·812
12	·7966	13	12·797
13	·7809	14	13·781
14	·7652	15	14·765
15	·7496	1	15·750
16	·7340	2	16·734
17	·7183	3	17·718
18	·7027	4	18·703
19	·6870	5	19·687
20	·6714	6	20·671
21	·6557	7	21·656
22	·6401	8	22·640
23	·6244	9	23·624
24	·6088	10	24·609
25	·5932	11	25·593
26	·5775	12	26·577
27	·5619	13	0·007
28	·5462	14	0·992
29	·5306	15	1·976

Jyeshṭha.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
30	·5149	1	2·960
31	·4993	2	3·945
32	·4836	3	4·929
33	·4680	4	5·913
34	·4523	5	6·898
35	·4367	6	7·882
36	·4210	7	8·866
37	·4054	8	9·851
38	·3898	9	10·835
39	·3741	10	11·819
40	·3585	11	12·804
41	·3428	12	13·788
42	·3272	13	14·773
43	·3115	14	15·757
44	·2959	15	16·741
45	·2802	1	17·726
46	·2646	2	18·710
47	·2489	3	19·694
48	·2333	4	20·679
49	·2176	5	21·663
50	·2020	6	22·647
51	·1863	7	23·632
52	·1707	8	24·616
53	·1551	9	25·600
54	·1394	10	26·585
55	·1238	11	0·015
56	·1081	12	0·999
57	·0925	13	1·983
58	·0768	14	2·968
59	·0612	15	3·952

Āshāḍha.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
60	·0455	1	4·936
61	·0299	2	5·921
62	·0142	3	6·905
62	·9986	4	7·889
63	·9829	5	8·874

Āshāḍha—cont.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
64	·9673	6	9·858
65	·9516	7	10·842
66	·9360	8	11·827
67	·9203	9	12·811
68	·9047	10	13·795
69	·8891	11	14·780
70	·8734	12	15·764
71	·8578	13	16·749
72	·8421	14	17·733
73	·8265	15	18·717
74	·8108	1	19·702
75	·7952	2	20·686
76	·7795	3	21·670
77	·7639	4	22·655
78	·7482	5	23·639
79	·7326	6	24·623
80	·7169	7	25·608
81	·7013	8	26·592
82	·6856	9	0·022
83	·6700	10	1·006
84	·6543	11	1·991
85	·6387	12	2·975
86	·6231	13	3·959
87	·6074	14	4·944
88	·5918	15	5·928

Śrāvaṇa.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
89	·5761	1	6·912
90	5605	2	7·897
91	5448	3	8·881
92	·5292	4	9·865
93	·5135	5	10·850
94	·4979	6	11·834
95	·4822	7	12·818
96	·4666	8	13·803
97	·4509	9	14·787
98	·4353	10	15·771
99	·4196	11	16·756
100	·4040	12	17·740
101	·3883	13	18·725
102	·3727	14	19·709
103	·3571	15	20·693
104	·3414	1	21·678
105	·3258	2	22·662
106	·3101	3	23·646
107	·2945	4	24·631
108	·2788	5	25·615
109	·2632	6	26·599
110	·2475	7	0·029
111	·2319	8	1·013
112	·2162	9	1·998
113	·2006	10	2·982
114	·1849	11	3·966
115	·1693	12	4·951
116	·1536	13	5·935
117	·1380	14	6·920
118	·1223	15	7·904

Bhādrapada.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
119	·1067	1	8·888
120	·0911	2	9·873
121	·0754	3	10·857
122	·0598	4	11·841
123	·0441	5	12·826
124	·0285	6	13·810
125	·0128	7	14·794
125	·9972	8	15·779
126	·9815	9	16·763
127	·9659	10	17·747

Bhādrapada—cont.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
128	·9502	11	18·732
129	·9346	12	19·716
130	·9189	13	20·700
131	·9033	14	21·685
132	·8876	15	22·669
133	·8720	1	23·654
134	·8563	2	24·638
135	·8407	3	25·622
136	·8251	4	26·607
137	·8094	5	0·036
138	·7938	6	1·021
139	·7781	7	2·005
140	·7625	8	2·989
141	·7468	9	3·974
142	·7312	10	4·958
143	·7155	11	5·942
144	·6999	12	6·927
145	·6842	13	7·911
146	·6686	14	8·896
147	·6529	15	9·880

Āśvina.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
148	·6373	1	10·864
149	·6216	2	11·849
150	·6060	3	12·833
151	·5904	4	13·817
152	·5747	5	14·802
153	·5591	6	15·786
154	·5434	7	16·770
155	·5278	8	17·755
156	·5121	9	18·739
157	·4965	10	19·723
158	·4808	11	20·708
159	·4652	12	21·692
160	·4495	13	22·676
161	·4339	14	23·661
162	·4182	15	24·645
163	·4026	1	25·630
164	·3869	2	26·614
165	·3713	3	0·044
166	·3556	4	1·028
167	·3400	5	2·012
168	·3244	6	2·997
169	·3087	7	3·981
170	·2931	8	4·965
171	·2774	9	5·950
172	·2618	10	6·934
173	·2461	11	7·918
174	·2305	12	8·903
175	·2148	13	9·887
176	·1992	14	10·872
177	·1835	15	11·856

Kārttika.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
178	·1679	1	12·840
179	·1522	2	13·825
180	·1366	3	14·809
181	·1209	4	15·793
182	·1053	5	16·778
183	·0896	6	17·762
184	·0740	7	18·746
185	·0584	8	19·731
186	·0427	9	20·715
187	·0271	10	21·699
188	·0114	11	22·684
188	·9958	12	23·668
189	·9801	13	24·652
190	·9645	14	25·637
191	·9488	15	26·621

Kārttika—cont.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
192	·9332	1	0·051
193	·9175	2	1·035
194	·9019	3	2·020
195	·8862	4	3·004
196	·8706	5	3·988
197	·8549	6	4·973
198	·8393	7	5·957
199	·8236	8	6·941
200	·8080	9	7·926
201	·7924	10	8·910
202	·7767	11	9·894
203	·7611	12	10·879
204	·7454	13	11·863
205	·7298	14	12·848
206	·7141	15	13·832

Mārgaśirsha.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
207	·6985	1	14·816
208	·6828	2	15·801
209	·6672	3	16·785
210	·6515	4	17·769
211	·6359	5	18·754
212	·6202	6	19·738
213	·6046	7	20·722
214	·5889	8	21·707
215	·5733	9	22·691
216	·5576	10	23·675
217	·5420	11	24·660
218	·5264	12	25·644
219	·5107	13	26·628
220	4951	14	0·058
221	·4794	15	1·043
222	·4638	1	2·027
223	·4481	2	3·011
224	·4325	3	3·996
225	·4168	4	4·980
226	·4012	5	5·964
227	·3855	6	6·949
228	·3699	7	7·933
229	·3542	8	8·917
230	·3386	9	9·902
231	·3229	10	10·886
232	·3073	11	11·870
233	·2916	12	12·855
234	·2760	13	13·839
235	·2604	14	14·824
236	·2447	15	15·808

Pausha.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
237	·2291	1	16·792
238	·2134	2	17·777
239	·1978	3	18·761
240	·1821	4	19·745
241	·1665	5	20·730
242	·1508	6	21·714
243	·1352	7	22·698
244	·1195	8	23·683
245	·1039	9	24·667
246	·0882	10	25·651
247	·0726	11	26·636
248	·0569	12	0·065
249	·0413	13	1·050
250	·0257	14	2·034
251	·0103	15	3·019
251	·9944	1	4·003
252	·9787	2	4·987
253	·9631	3	5·972
254	·9474	4	6·956
255	·9318	5	7·940

Pausha—cont.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
256	·9161	6	8·925
257	·9005	7	9·909
258	·8848	8	10·893
259	·8692	9	11·878
260	·8535	10	12·862
261	·8379	11	13·846
262	·8222	12	14·831
263	·8066	13	15·815
264	·7909	14	16·799
265	·7753	15	17·784

Māgha.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
266	·7597	1	18·768
267	·7440	2	19·753
268	·7284	3	20·737
269	·7127	4	21·721
270	·6971	5	22·706
271	·6814	6	23·690
272	·6658	7	24·674
273	·6501	8	25·659
274	·6345	9	26·643
275	·6188	10	0·078
276	·6032	11	1·057
277	·5875	12	2·041
278	·5719	13	3·026
279	·5562	14	4·010
280	·5406	15	4·995
281	·5249	1	5·979
282	·5093	2	6·963
283	·4937	3	7·948
284	·4780	4	8·932
285	·4624	5	9·916
286	·4467	6	10·901
287	·4311	7	11·885
288	·4154	8	12·869
289	·3998	9	13·854
290	·3841	10	14·838
291	·3685	11	15·822
292	·3528	12	16·807
293	·3372	13	17·791
294	·3215	14	18·775
295	·3059	15	19·760

Phālguna.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
296	·2902	1	20·744
297	·2746	2	21·729
298	·2589	3	22·713
299	·2433	4	23·697
300	·2277	5	24·682
301	·2120	6	25·666
302	·1964	7	26·650
303	·1807	8	0·080
304	·1651	9	1·064
305	·1494	10	2·049
306	·1338	11	3·033
307	·1181	12	4·017
308	·1025	13	5·002
309	·0868	14	5·986
310	·0712	15	6·971
311	·0555	1	7·955
312	·0399	2	8·939
313	·0242	3	9·924
314	·0086	4	10·908
314	·9929	5	11·892
315	·9773	6	12·877
316	·9617	7	13·861
317	·9460	8	14·845
318	·9304	9	15·830
319	·9147	10	16·814

Phālguna—cont.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for
320	·8991	11	17·7
321	·8834	12	18·7
322	·8678	13	19·7
323	·8521	14	20·7
324	·8365	15	21·7

Chaitra (when there is no adhika masa)

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for
325	·8208	1	22·7
326	·8052	2	23·7
327	·7895	3	24·6
328	·7739	4	25·6
329	·7582	5	26·6
330	·7426	6	0·0
331	·7269	7	1·0
332	·7113	8	2·0
333	·6957	9	3·0
334	·6800	10	4·0
335	·6644	11	5·0
336	·6487	12	5·9
337	·6331	13	6·9
338	·6174	14	7·9
339	·6018	15	8·9
340	·5861	1	9·9
341	·5705	2	10·9
342	·5548	3	11·9
343	·5392	4	12·8
344	·5235	5	13·8
345	·5079	6	14·8
346	·4922	7	15·8
347	·4766	8	16·8
348	·4610	9	17·8
349	·4453	10	18·7
350	·4297	11	19·7
351	·4140	12	20·7
352	·3984	13	21·7
353	·3827	14	22·7
354	·3671	15	23·7

Chaitra (when there is adhika masa).

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for
355	·3514	1	24·6
356	·3358	2	25·6
357	·3201	3	26·6
358	·3045	4	0·0
359	·2888	5	1·0
360	·2732	6	2·0
361	·2575	7	3·0
362	·2419	8	4·0
363	·2262	9	5·0
364	·2106	10	6·0
365	·1950	11	6,9
366	·1793	12	7·9
367	·1637	13	8·9
368	·1480	14	9·9
369	·1324	15	10·9
370	·1167	1	11·9
371	·1011	2	12·8
372	·0854	3	13·8
373	·0698	4	14·8
374	·0541	5	15·8
375	·0385	6	16·8
376	·0228	7	17·8
377	·0072	8	18·7
377	·9915	9	19·7
378	·9759	10	20·7
379	·9602	11	21·7
380	·9446	12	22·7
381	·9290	13	23·7
382	·9133	14	24·7
383	·8977	15	25·6

ĀRYA SIDDHĀNTA EYE-TABLE—Specimen problems from ancient Tamil literature.

This Eye-table **alone** will enable any one to solve correctly, to four decimal places of a day, and by a single operation any problem in solar dates, nakshatras or week-days, for 2,000 years, i.e., from B.C. 1 to 2000 A.D. The tables of equations are given to two places of decimals in the abridged sections **e** to **i** of the eye-table—see next page—and to four places of decimals in the unabridged sections **e** to **i**, page 179 to 186 below.

The computation of the ending moment, whether of a tithi, or of a nakshatra, or of a yoga, always comprises four processes: (1) to find the mean ending moment; (2) to find the anomaly or anomalies for that moment; (3) to find the equation or equations corresponding to the anomaly or anomalies; and (4) to add together the mean ending moment and the equation or equations.

Problem I.—Required to find the ending moment, by Ārya siddhānta, of Āshāḍha Full moon tithi (when there was a lunar eclipse) in A.D. 634—See the Paripāḍal horoscope, Ch. V, sec. vi, page 100 of the Text.

Commencement of solar year. Col. 1.	Days of solar year and sun's anomaly in days of solar year. Col. 2.	Moon's anomaly. Col. 3.
600 A.D. .. ... March 19·229165 **k** 34 years ... .. ·79514 **n** 684 A.D. ... ... March 20·02430 **(1)**	First new moon in solar year. { 400 A.D. ... 1·22789 **l** 34 years ... 13·58446 **o** 634 A.D ... 14·81236 **(2)** }	25·95007 **m** 19·23974 **p** 14 81236 **(2)**
N.B.—This, by itself, is a valuable piece of information, giving the English year, month, day and fraction of day on which a particular Indian solar year between 1 B.C. and A.D. 2000 commenced by Ārya siddhānta; and this information can be had in a few seconds from the eye-table, sections **k** and **n** for any one of 2,000 years.	*Add* for Āshāḍha new moon ... 59·9612 **b** Do. 15 tithis ... ... 14·7658 **d** 88·6389 **(4)**	60·00217 −55 1090 **d** (2 Anom months). 4 8932 **(3)** (☾'s An. at 1st N.M. in S. year). 8·952 **c** 14·7653 **d** 23·610 − ·0222 **h** (☉'s equation).
Note how stages **(1), (2), (3), (4), (5), (6), (7)** and **(8)** are successively arrived at with the help of the eye-table and then add together **(4), (8)** and **(1)**, as shown in column 2	Sum of ☉'s and ☾'s eqns. (Col. 3) + ·2830 **(8)** *Add* commencement of solar year (first column) Mar. 20·0243 **(1)** Actual ending moment Mar. 108·9462 **(9)**	23·588 **(5)** ☉'s eqn. for An of 88 64 d. **(4)** ... ... − ·0222 **h** **(6)** ☾'s eqn. for An. of 23·588 d. **(5)** ... ... + 3052 **e** **(7)** Sum of ☉'s+☾'s eqns + ·2830 **(8)**

We reach, for the ending moment of the full-moon tithi, or the centre of the lunar eclipse, March 108·9462. By Eye-table **q**, the 93rd day from March 1 is June 1 Therefore the 108th day from March 1 = June 16 ... **q**; and by Eye-table **r**, ·9500 of a day = 57 ghaṭikas and ·0032 day = 12 palas.

∴ The full-moon tithi ended and the eclipse occurred, according to Ārya siddhānta, at 56 ghat. 48 palas after mean sunrise or by Table VI at 22 hours, 42½ minutes, i e, one hour and 17½ minutes before sunrise on Friday, 17th June A D. 634.

Problem II.—The same problem worked to four places of decimals with the aid of Table II and Eye-tables **y, e** *and* **h.**

	Days of solar year.	Moon's mean anomaly in days	☉'s and ☾'s equations.
Table II, first new moon in solar year acc. to Ār. siddh. ..	14·8124	4·893	☉'s eqn. for 88·64 d. = − 0222 (E.T. **h**)
Eye-table **y**. Āshāḍha Su. 15	73 8265	18·717	☾'s eqn for 23·588 d. = + ·3052 (E.T. **e**)
	88·6389	23·610	Sum of ☉'s + ☾'s eqns. + ·2830
Add sum of ☉'s and ☾'s eqns. acc. to last column .	+ ·2830	− ·0222 (☉'s eqn. in last column).	
Add Eng. month and day, marking commencement of S. yr. A.D 634–35 (Table II)	Mar. 20 0243	23·588	
	Mar. 108·9462 = June 16, A.D. 634, 56 gh 48 p after mean sunrise (E.T **q** and **r**.)		

Same problem.—The shortest method and the one ordinarily used by the author for tithis like the present one, when the Ephemeris is not available.

(*N B.*—All the entries in the first dotted line are from Table II.)

New moon tithi, Āshāḍha, A.D. 634–5 ... **(4)** June 1·90	1st N.M. in S. year ... 14·81	An. of 1st N.M. in S. Yr.	.. 4·89 Tab. II.
Eye-table **d**. *Add* for 15 tithis .. 14·76	(E.T. **y**) *Add for* Āshāḍha, Śukla 15 ... .. 73·83	.. ..	18·72 **y**
(19) June 16·66	88 64		23·61
		(Abridged Eye-tab **h**) ☉'s eqn. for An of 88 64 d ...	−·02 −·02
		(Abridged Eye-tab. **e**) ☾'s eqn. for An. of 23·59 d. .	23·59 ... +·30
Sum of ☉'s and ☾'s eqns. (last column). + ·28			+·28

(19) June 16·94 = Thursday, 16 June A.D. 634, at ·94 of day or 1½ hours or 3¾ gh. before sunrise on Friday, 17 June

Problem III.—Required to find the moment of commencement of the 1st **Svāti** *nakshatra (No. 15) or the ending moment of Chitra nakshatra (No. 14) in the month of Chittrai—Mēsha, A.D. 756, the date probably referred to in Silappadhikāram, Nadukaṇkādai.*

(The Ephemeris gives this information complete, but the method may be used in other cases where the Ephemeris is not available.)

Table II. Mean ending moment of new moon tithi, Chaitra, A.D 755–56	(6) Mar. 5·97	☾'s An in days
,, Anomaly of 1st N.M. in solar year A.D. 755–56	... ...	... 14·66
Eye-table **c**. *Add* for anomaly of Chaitra new moon, same year (no adhika month).	... ...	21·74
		36·40
Eye-table **s** Shortest interval from Chaitra N.M. to nakshatra Chaitra (No. 14) ...	... 15·14	... 15·14
Eye-table **t, u** Nakshatra correction for 1st N.M. in S. year 25·81 days, i.e., correction for 25 days = 0·34 **t**. Correction for ·81 day = − 0·06 **u**.		
Total nakshatra correction for 25·81 days = 0·34−0·06 = 0·28	... 0·28	... 0·28
		51·82
		− 27·55 (1 An. Mo. E.T. **d**)
Abridged Eye-table **f**, moon's nak. eqn. for anom. of 24·27 days (last column) ...	+ ·24	24·27
	(22) Mar. 21·68	

That is, Sunday, 21st March A.D. 756, ·68 of a day, or 38 ghaṭikas after mean sunrise.

EYE-TABLE FOR

NOTE.—The different parts of the Table are lettered in order from a to y and. All the figures, except where otherwise indicated.

z Order of signs of zodiac or rāśis and longitude at commencement	1...0°	2.. 30°	3...60°	4..90°
Bengal solar months ...	Vaiśākha	Jyeshtha	Ashāḍha	Sravaṇa
Tamil and Malayālam solar months; also names of rāśis	Mesha / Medam	Vrishabha / Edavam	Mithuna	Karkaṭaka
Tamil solar months...	Chittrai	Vaiyāśi	Āni	Āḍi
a Moment of sankrānti in days of solar year, and decimals of a day	0·0	30·9250	62·3261	93·9333
English date corresponding to each sankrānti (A.D. 1911)	Apr. 13	May 14	June 14	July 16
Lunar month: each month commences *before* sankrānti noted in *next* column	(1) *Vaiśākha*	(2) *Jyeshṭha*	(3) *Ashāḍha*	(4) *Śrāvaṇa*
b Increase in days, (1) of lunar months, (2) of sun's anomaly	0·000	29·5306	59·0612	88·5918
c „ of ☾'s An. when interval between Mesha sank. and 1st N.M. in sol. year is 0·00 day	0·000	1·976	3·952	5·928

Tithi equivalents in days and

d Tithi equivalent in days ...	**1**	**2**	**3**	**4**	**5**
	·9843	1·9687	2·9531	3·9374	4·9218
	16	**17**	**18**	**19**	**20**
	15·7496	16·7340	17·7182	18·7027	19·6871

e, f, g Moon's equation of the centre and moon's anomaly in days and

	·00	**·01**	**·02**	**·03**	**·04**	**·05**	**·06**	**·07**	**·08**	**·09**	**·10**	**·11**	**·12**	**13**	**·14**	**15**	**·16**	**·17**	**·18**	**·19**	**·20**
−	0·00	0·12	0·23	0·35	0·47	0·58	0·70	0·82	0·94	1·06	1·18	1·30	1·42	1·54	1·66	1·79	1·91	2·04	2·17	2·30	2·43
−	13·78	13·68	13·58	13·49	13·39	13·29	13·20	13·10	13·00	12·90	12·80	12·70	12·60	12·50	12·39	12·29	12·18	12·08	11·97	11·86	11·75
+	13·78	13·87	13·97	14·07	14·16	14·26	14·36	14·46	14·55	14·65	14·75	14·85	14·96	15·06	15·16	15·27	15·37	15·48	15·58	15·69	15·80
+	27·55	27·44	27·32	27·20	27·09	26·97	26·85	26·73	26·62	26·50	26·38	26·26	26·13	26·01	25·89	25·76	25·64	25·51	25·39	25·26	25·13
−	0·00	0·12	0·25	0·38	0·50	0·63	0·75	0·88	1·01	1·14	1·27	1·40	1·53	1·66	1·79	1·93	2·06	2·20	2·34	2·48	2·63
−	13·78	13·67	13·57	13·46	13·35	13·25	13·14	13·04	12·93	12·82	12·71	12·60	12·49	12·38	12·26	12·15	12·03	11·92	11·80	11·67	11·55
+	13·78	13·88	13·99	14·09	14·20	14·30	14·41	14·52	14·62	14·73	14·84	14·95	15·06	15·18	15·29	15·40	15·52	15·64	15·76	15·88	16·01
+	27·55	27·43	27·30	27·18	27·05	26·93	26·80	26·67	26·55	26·42	26·29	26·16	26·03	25·89	25·76	25·63	25·49	25·35	25·21	25·07	24·92
−	0·00	0·13	0·27	0·40	0·54	0·67	0·81	0·94	1·08	1·22	1·36	1·50	1·64	1·78	1·92	2·07	2·22	2·37	2·52	2·67	2·83
−	13·78	13·66	13·55	13·43	13·32	13·21	13·09	12·97	12·86	12·74	12·62	12·50	12·38	12·25	12·13	12·01	11·88	11·75	11·62	11·48	11·34
+	13·78	13·89	14·00	14·12	14·23	14·35	14·46	14·58	14·70	14·81	14·93	15·05	15·17	15·30	15·42	15·54	15·67	15·80	15·94	16·07	16·21
+	27·55	27·42	27·29	27·15	27·02	26·88	26·75	26·61	26·47	26·34	26·20	26·06	25·92	25·77	25·63	25·49	25·34	25·19	25·03	24·88	24·72

h For tithis. Sun's equation of the centre and sun's anomaly in days of the solar

+·176	**+·175**	**+·17**	**+ 16**	**+·15**	**+·14**	**+·13**	**+·12**	**+ 11**	**+·10**	**+·09**	**+·08**	**+·07**	**+ 06**	**+·05**	**+·04**	**+·03**	**+·02**	**+·01**	**+ 00**
357·90	362	5	15	22	28	33	38	42	46	50	54	57	61	65	68	71	75	78	81·29
352·20	348	340	330	323	317	312	307	303	299	295	291	288	284	281	277	274	271	267	263·92

i For yogas.—Sun's equation	**−·152**	**−·151**	**−·150**	**−·14**	**− 13**	**−·12**	**−·11**	**−·10**	**−·09**	**−·08**	**−·07**	**− 06**	**−·05**	**−·04**	**−·03**
„ Anomaly in days of solar year	355·88	361	364	13	22	28	34	40	44	49	53	58	62	66	70
	354·89	350	347	332	324	317	311	306	301	296	292	288	283	279	275

j Perpetual almanac for European calendar.

[*N.B.*—Heavy type means week-day, Sunday being **1**, Monday **2**, etc.]

	1	**2**	**3**	**4**	**5**	**6**	**7** or **0**
Centuries B.C.	3001	3101	3201				
	2301	2401	2501	2601	2701	2801	2901
	1601	1701	1801	1901	2001	2101	2201
	901	1001	1101	1201	1301	1401	1501
	201	301	401	501	601	701	801
						1	101
Centuries A.D. old style.	500	400	300	200	100	0	
	1200	1100	1000	900	800	700	600
			1700	1600	1500	1400	1300
Centuries A.D. new style.	1600	1900		1800		1700	
	2000	2300		2200		2100	

N.B.—B.C. years should be made positive thus: 44 B.C. is 57th year of century beginning with 101 B.C. —see page 14 of Text.

N.B.—Old Style ceased in continental countries (exc. Russia) on 4-10-1582 and New Style began on 15-10-1582, 10 days being dropped. In United Kingdom, New Style began on 14-9-1752, 11 days being dropped.

	1	**2**	**3**	**4**	**5**	**6**	**7** or **0**	**1**	**2**	**3**	**4**	**5**	**6**	**7** or **0**
Odd years in a century.	1	2	3	...	4	5	6	...	52	53	54	55	...	56
	7	...	8	9	10	11	...	57	58	59	...	60	61	62
	12	13	14	15		16	17	63	.	64	65	66	67	...
	18	19	...	20	21	22	23	68	69	70	71	...	72	73
	..	24	25	26	27	...	28	74	75	...	76	77	78	79
	29	30	31	...	32	33	34	.	80	81	82	83	...	84
	35	...	36	37	38	39	...	85	86	87	...	88	89	90
	40	41	42	43	..	44	45	91	...	92	93	94	95	...
	46	47	..	48	49	50	51	96	97	98	99	...	...	...

Months in	**1**	**2**	**3**	**4**	**5**	**6**	**7** or **0**
Ordinary years.	Aug.	Feb. Mar. Nov.	June	Sep. Dec.	Apr. July	Jan. Oct.	May
Leap years ...	Feb.	...	...	...	Jan.	...	...

[*Example.—To find week-day of 26th Jan. 1844—*
Add 4 + 6 + 5 + 26 and divide the total 41 by 7. Remainder, 6 = Friday.]

Ārya siddhānta constants for centuries.

Year A.D.	Kaliyuga.	Commencement of solar year. Month and date.	Fraction of day.	First new moon in solar year.	☾'s Anomaly at commencement of solar year.
		k		**l**	**m**
B.C.					
·1	3101	Mar. 14	·020832	9·97497	12·44500
A.D.					
100	3201	Mar. 14	·888887	13·43662	0·91097
200	3301	Mar 15	·756943	16·89826	16·93155
300	3401	Mar. 16	·624998	20·35990	5·39752
400	3501	Mar. 17	·493054	23·82154	21·41810
500	3601	Mar. 18	·361109	27·28318	9·88407
600	3701	Mar. 19	·229165	1·22789	25·95007
700	3801	Mar. 20	·097220	4·70820	14·46145
800	3901	Mar. 20	·965276	8·17851	2·97285
900	4001	Mar. 21	·833331	11·65383	19·03883
1000	4101	Mar. 22	·701387	15·12914	7·55022
1100	4201	Mar. 23	·569442	18·60446	23·61622
1200	4301	Mar. 24	·437498	22·07977	12·12760
1300	4401	Mar. 25	·305553	25·55508	0·63900
1400	4501	Mar, 26	·173609	29·03039	16·70498
1500	4601	Mar. 27	·041664	2·97511	5·21637
1600	4701	Mar. 27	·909720	6·45043	21·28237
1700	4801	Mar. 28	·777775	9·92574	9·79375
1800	4901	Apr. 10	·645831	13·40105	25·85975
1900	5001	Apr. 12	·513886	16·87636	14·87114

ĀRYA SIDDHĀNTA.

the way in which they are to be used is shown in the specimen problems on reverse.

represent days and fractions of a day.

5 ... 120°	6 ... 150°	7 ... 180°	8 ... 210°	9 ... 240°	10 ... 270°	11 ... 300°	12 ... 330°	
Bhādrapada	Āśvina	Kārttika	Mārgaśirsha	Pausha	Māgha	Phālguna	Chaitra.	
Siṁha	Kanyā	Tulā	Vṛiśchika	Dhanus	Makara	Kumbha	Mīna	—
Āvaṇi	Puraṭṭāśi	Aippaśi	Kārttigai	Mārgaḷi	Tai	Māśi	Panguni	
125·4011	156·4358	186·8925	216·7958	246·3044	275·6550	305·1117	334·9200	365·2588
Aug. 16	Sep. 16	Oct. 17	Nov. 16	Dec. 15	Jan. 14	Feb. 12	Mar. 13	
(5) *Bhādrapada*	(6) *Āśvina*	(7) *Kārttika*	(8) *Mārgaśirsha*	(9) *Pausha*	(10) *Māgha*	(11) *Phālguna*	(12) *Chaitra*	(13) *Chaitra when there is an adhika month.*
118·1228	147·6580	177·1835	206·7141	236·2447	265·7753	295·3059	324·8365	354·3670
7·904	9·880	11·856	13·832	15·808	17·784	19·760	21·736	23·712

decimals of a day, and moon's anomalistic months.

6	7	8	9	10	11	12	13	14	15
5·9061	6·8905	7·8748	8·8592	9·8435	10·8379	11·8122	12·7966	13·7809	14·7653
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
20·6714	21·6558	22·6401	23·6245	24·6988	25·5932	26·5775	27·5619	28·5462	29·5306

Moon's anomalistic months.

1 month = 27·5545 days
2 months = 55·1090 days.

12 months = 330·6540
13 months = 358·2085

decimals of a day. (The signs − and + are to be applied to the equation in heavy type and not to the anomaly.)

·21	·22	·23	·24	·25	·26	·27	·28	·29	·30	·31	·32	·33	·34	·35	·36	·37	·38	·39	·40	·41	
2·56	2·70	2·83	2·97	3·11	3·26	3·41	3·56	3·72	3·89	4·05	4·23	4·41	4·60	4·81	5·03	5·27	5·54	5·85	6·28	6·93	**e For tithis.**
11·64	11·52	11·40	11·28	11·16	11·04	10·91	10·77	10·63	10·49	10·34	10·19	10·02	9·85	9·67	9·46	9·25	9·00	8·71	8·35	7·67	
15·92	16·03	16·15	16·27	16·39	16·52	16·65	16·78	16·92	17·06	17·21	17·37	17·53	17·70	17·89	18·09	18·31	18·55	18·84	19·21	19·89	
25·00	24·86	24·72	24·58	24·44	24·29	24·14	23·99	23·83	23·67	23·50	23·33	23·14	22·95	22·74	22·52	22·29	22·02	21·71	21·33	20·62	
2·77	2·92	3·08	3·23	3·39	3·56	3·73	3·91	4·09	4·28	4·49	4·70	4·93	5·18	5·46	5·79	6·19	6·99				**f For nakshatras.**
11·42	11·29	11·16	11·02	10·88	10·74	10·59	10·43	10·27	10·09	9·91	9·72	9·51	9·28	9·01	8·71	8·32	7·55				
16·13	16·26	16·39	16·53	16·67	16·82	16·97	17·12	17·29	17·46	17·64	17·84	18·05	18·27	18·54	18·85	19·28	20·00				
24·78	24·63	24·48	24·32	24·16	23·99	23·82	23·65	23·46	23·27	23·07	22·85	22·62	22·38	22·09	21·76	21·36	20·57				
2·99	3·16	3·33	3·51	3·69	3·88	4·08	4·28	4·50	4·73	4·98	5·26	5·59	5·98	6·56							**g For yogas.**
11·20	11·06	10·90	10·75	10·59	10·42	10·24	10·06	9·86	9·65	9·41	9·15	8·85	8·47	7·92							
16·35	16·50	16·65	16·80	16·97	17·13	17·31	17·50	17·69	17·90	18·14	18·40	18·71	19·08	19·64							
24·56	24·39	24·22	24·05	23·87	23·68	23·48	23·27	23·06	22·83	22·57	22·29	21·96	21·57	21·00							

year and decimals of a day. (The anomalies are entered in ordinary type and the equations, with appropriate signs, in heavy type.)

−·01	**−·02**	**−·03**	**−·04**	**−·05**	**−·06**	**−·07**	**−·08**	**−·09**	**−·10**	**−·11**	**−·12**	**−·13**	**−·14**	**−·15**	**−·16**	**−·17**	**−·175**	**−·176**	
85	88	91	95	98	102	105	109	113	116	121	125	130	135	141	148	157	166	169·93	
261	257	254	251	247	244	240	237	233	229	225	220	216	211	205	198	188	180	175·63	
−·02	**−·01**	**−·00**	**+·01**	**+·02**	**+·03**	**+·04**	**+·05**	**+·06**	**+·07**	**+·08**	**+·09**	**+·10**	**+·11**	**+·12**	**+·13**	**+·14**	**+·150**	**+·151**	**+·152**
74	77	80·29	85	89	93	97	101	105	109	113	118	123	128	134	141	149	164	167	171·96
272	268	263·92	260	256	252	248	244	240	236	232	227	222	217	211	204	196	181	178	172·95

Ārya siddhānta—Odd years.

	Fraction of day, marking commencement of solar year.	First new moon in solar year.	☾'s anomaly for beginning of solar year.		Fraction of day, marking commencement of solar year.	First new moon in solar year.	☾'s anomaly for beginning of solar year.		Fraction of day, marking commencement of solar year.	First new Moon in solar year.	☾'s anomaly for beginning of solar year.
	n	o	p		n	o	p		n	o	p
1	·25868	18·63903	7·04931	**38**	·82986	29·07937	19·88238	**75**	1·40104	9·98913	5·16084
2	·51736	7·74745	14·09862	**39**	1·08854	18·18780	26·93169	**76**	·65972	28·62815	12·21015
3	·77604	26·38648	21·14793	**40**	·34722	7·29624	6·42640	**77**	·91840	17·73659	19·25946
4	·03472	15·49492	0·64264	**41**	·60590	25·93526	13·47571	**78**	1·17708	6·84502	26·30877
5	·29340	4·60335	7·69195	**42**	·86458	15·04370	20·52502	**79**	1·43576	25·48405	5·80848
6	·55208	23·24238	14·74126	**43**	1·12326	4·15214	0·01973	**80**	·69444	14·59249	12·85279
7	·81076	12·35082	21·79057	**44**	·38194	22·79116	7·06904	**81**	·95312	3·70092	19·90210
8	·06944	1·45924	1·28528	**45**	·64062	11·89959	14·11835	**82**	1·21180	22·33994	26·95141
9	·32812	20·09827	8·33459	**46**	·89930	1·00803	21·16766	**83**	1·47048	11·44838	6·44612
10	·58680	9·20671	15·38390	**47**	1·15799	19·64705	0·66237	**84**	·72917	0·55681	13·49543
11	·84549	27·84573	22·43321	**48**	·41667	8·75549	7·71168	**85**	·98785	19·19584	20·54474
12	·10417	16·95417	1·92792	**49**	·67535	27·39452	14·76099	**86**	1·24653	8·30428	0·03945
13	·36285	6·06260	8·97723	**50**	·93403	16·50294	21·81030	**87**	1·50521	26·94329	7·08876
14	·62153	24·70162	16·02654	**51**	1·19271	5·61138	1·30500	**88**	·76389	16·05178	14·13807
15	·88021	13·81006	23·07585	**52**	·45139	24·25041	8·35432	**89**	1·02257	5·16017	21·18738
16	·13889	2·91850	2·57056	**53**	·71007	13·35884	15·40363	**90**	1·28125	23·79919	0·68209
17	·39757	21·55752	9·61987	**54**	·96875	2·46728	22·45294	**91**	1·53993	12·90763	7·73140
18	·65625	10·66596	16·66918	**55**	1·22743	21·10630	1·94764	**92**	·79861	2·01607	14·78071
19	·91493	29·30498	23·71849	**56**	·48611	10·21474	8·99695	**93**	1·05729	20·65508	21·83002
20	·17361	18·41341	3·21320	**57**	·74479	28·85376	16·04627	**94**	1·31597	9·76352	1·32474
21	·43229	7·52185	10·26251	**58**	1·00347	17·96219	23·09558	**95**	1·57465	28·40254	8·37405
22	·69097	26·16088	17·31182	**59**	1·26215	7·07063	2·59028	**96**	·83333	17·51098	15·42336
23	·94965	15·26930	24·36113	**60**	·52083	25·70966	9·63959	**97**	1·09201	6·61942	22·47267
24	·20833	4·37774	3·85584	**61**	·77951	14·81810	16·68890	**98**	1·35069	25·25844	1·96738
25	·46701	23·01677	10·90515	**62**	1·03819	3·92653	23·73822	**99**	1·60937	14·36687	9·01668
26	·72569	12·12520	17·95446	**63**	1·29687	22·56555	3·23292	**100**	·86805	3·47531	16·06600
27	·98437	1·23364	25·00377	**64**	·55555	11·67399	10·28223	**200**	·73611	6·95062	4·57738
28	·24305	19·87267	4·49848	**65**	·81423	0·78243	17·33154	**300**	·60417	10·42593	20·64332
29	·50174	8·98109	11·54779	**66**	1·07292	19·42144	24·38086	**400**	·47222	13·90124	9·15466
30	·76042	27·62012	18·59710	**67**	1·33160	8·52989	3·87556	**500**	·34028	17·37655	25·22064
31	1·01910	16·72856	25·64641	**68**	·59028	27·16891	10·92488	**600**	·20833	20·85186	13·73208
32	·27778	5·83699	5·14112	**69**	·84896	16·27734	17·97419	**700**	·07639	24·32717	2·24342
33	·53646	24·47602	12·19043	**70**	1·10764	5·38578	25·02350	**800**	·94444	27·80248	18·30941
34	·79514	13·58446	19·23974	**71**	1·36632	24·02480	4·51820	**900**	·81250	1·74720	6·82080
35	1·05382	2·69288	26·28905	**72**	·62500	13·13323	11·56751	**1000**	·68055	5·22251	22·88679
36	·31250	21·33191	5·78376	**73**	·88368	2·24167	18·61682	**2000**	·36111	10·44502	18·21898
37	·57118	10·44035	12·83307	**74**	1·14236	20·88070	25·6661	**3000**	.04166	15·66753	13·55117

q Days counted from March 1

	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sep. 1	Oct. 1	Nov. 1	Dec. 1	Jan. 1	Feb. 1	Mar. 1
March ...	1	32	62	93	123	154	185	215	246	276	307	338	..

r Ghaṭikas ...	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Fraction of day.	·0167	·0333	·0500	·0667	·0833	·1000	·1167	·1333	·1500	·1667	·1833	·2000	·2167	·2333
Ghaṭikas ...	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**
Fraction of day.	·5167	·5333	·5500	·5667	·5833	·6000	·6167	·6333	·6500	·6667	·6833	·7000	·7167	·7333
Palas ...	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**15**	**17**	**20**
Fraction of day.	·0003	·0005	·0008	·0011	·0014	·0017	·0019	·0022	·0025	·0028	·0033	·0042	·0047	·0055

NAKSHA

s Shortest interval in days, from new moon to ending

Longitude at commencement. Deg.	Min.	Order	Names of nakshatras.	Days.	Order	Ordinarily Vaiśākha I	Order	Ordinarily Jyeshṭha II	Order	Ordinarily Āshāḍha III	Order	Ordinarily Śrāvaṇa IV	Order	Ordinarily Bhādrapada V	Order	Ordinarily Āśvina VI	Order	Ordinarily Kārttika VII
		27	Revati ...		**3**	0·9874	**5**	0·8023	**7**	0·6172	**9**	0·4321	**11**	0·2470	**13**	0·0620	**16**	0·8888
0	0	**1**	Aśvini ..	1·0119	**4**	1·9993	**6**	1·8142	**8**	1·6291	**10**	1·4410	**12**	1·2590	**14**	1·0739	**17**	1·9007
13	20	**2**	Bharaṇi	2,0238	**5**	3·0112	**7**	2·8261	**9**	2·6410	**11**	2·4560	**13**	2·2709	**15**	2·0858	**18**	2·9126
26	40	**3**	Kṛittikā	3·0357	**6**	4·0231	**8**	3·8380	**10**	3·6530	**12**	3·4679	**14**	3·2828	**16**	3·0977	**19**	3·9245
40	0	**4**	Rohiṇi	4·0476	**7**	5·0350	**9**	4·8500	**11**	4·6649	**13**	4·4798	**15**	4·2947	**17**	4·1096	**20**	4·9364
53	20	**5**	Mṛigaśira	5·0596	**8**	6·0470	**10**	5·8619	**12**	5·6768	**14**	5·4917	**16**	5·3066	**18**	5·1215	**21**	5·9484
66	40	**6**	Ārdrā ...	6·0715	**9**	7·0589	**11**	6·8738	**13**	6·6887	**15**	6·5036	**17**	6·3185	**19**	6·1384	**22**	6·9603
80	0	**7**	Punarvasu	7·0834	**10**	8·0708	**12**	7·8857	**14**	7·7006	**16**	7·5155	**18**	7·3301	**20**	7·1454	**23**	7·9722
93	20	**8**	Pushya	8·0953	**11**	9·0827	**13**	8·8976	**15**	8·7125	**17**	8·5274	**19**	8·3424	**21**	8·1573	**24**	8·9841
106	40	**9**	Āśleshā	9·1072	**12**	10·0946	**14**	9·9095	**16**	9·7244	**18**	9·5394	**20**	9·3543	**22**	9·1692	**25**	9·9960
120	0	**10**	Maghā	10·1191	**13**	11·1065	**15**	10·9214	**17**	10·7364	**19**	10·5523	**21**	10·3662	**23**	10·1811	**26**	11·0079
133	20	**11**	Pūrva-Phalguni	11·1310	**14**	12·1184	**16**	11·9334	**18**	11·7488	**20**	11·5632	**22**	11·3781	**24**	11·1930	**27**	12·0198
146	40	**12**	Uttara-Phalguni	12·148	**15**	13·1304	**17**	12·9156	**19**	12·7602	**21**	12·5751	**23**	12·3900	**25**	12·2049	**1**	13·0318
160	0	**13**	Hasta ..	13·1549	**16**	14·1423	**18**	13·9572	**20**	13·7721	**22**	13·5870	**24**	13·4019	**26**	13·2168	**2**	14·0437
173	20	**14**	Chitrā	14·1668	**17**	15·1542	**19**	14·9691	**21**	14·7840	**23**	14·5989	**25**	14·4138	**27**	14·2288	**3**	15·0556
186	40	**15**	Svāti ..	15·1787	**18**	16·1661	**20**	15·9810	**22**	15·7959	**24**	15·6108	**26**	15·4258	**1**	15·2407	**4**	16·0675
200	0	**16**	Viśākhā	16·1906	**19**	17·1780	**21**	16·9929	**23**	16·8078	**25**	16·6228	**27**	16·4377	**2**	16·2526	**5**	17·0794
213	20	**17**	Anurādhā	17·2027	**20**	18·1899	**22**	18·0048	**24**	17·8198	**26**	17·6347	**1**	17·4496	**3**	17·2645	**6**	18·0918
226	40	**18**	Jyeshṭhā	18·2144	**21**	19·2018	**23**	19·0168	**25**	18·8317	**27**	18·6466	**2**	18·4615	**4**	18·2764	**7**	19·1032
240	0	**19**	Mūla ...	19·2264	**22**	20·2138	**24**	20·0287	**26**	19·8436	**1**	19·6585	**3**	19·4734	**5**	19·2883	**8**	20·1151
253	20	**20**	Pūrva-Āshāḍhā	20·2383	**23**	21·2257	**25**	21·0406	**27**	20·8555	**2**	20·6704	**4**	20·4853	**6**	20·3002	**9**	21·1271
266	40	**21**	Uttara-Āshāḍhā	21·2502	**24**	22·2376	**26**	22·0525	**1**	21·8674	**3**	21·6823	**5**	21·4972	**7**	21·3121	**10**	22·1390
280	0	**22**	Śrāvaṇa	22·2621	**25**	23·2495	**27**	23·0644	**2**	22·8793	**4**	22·6942	**6**	22·5091	**8**	22·3241	**11**	23·1509
293	20	**23**	Dhanishṭa	23·2740	**26**	24·2614	**1**	24·0763	**3**	23·8912	**5**	23·7061	**7**	23·5211	**9**	23·3360	**12**	24·1628
306	40	**24**	Śatabhishaj ...	24·2859	**27**	25·2733	**2**	25·0882	**4**	24·9031	**6**	24·7181	**8**	24·5330	**10**	24·3479	**13**	25·1747
320	0	**25**	Pūrva-Bhadrapadā ...	25·2978	**1**	26·2852	**3**	26·1001	**5**	25·9151	**7**	25·7300	**9**	25·5449	**11**	25·3598	**14**	26·1866
333	20	**26**	Uttara-Bhadrapadā ..	26·3098	**2**	27·2972	**4**	27·1121	**6**	26·9270	**8**	26·7419	**10**	26·5568	**12**	26·3717	**15**	27·1985
346	40	**27**	Revati	27·3217	**3**	28·3091	**5**	28·1240	**7**	27·9389	**9**	27·7538	**11**	27·5687	**13**	27·3836	**16**	28·2105
					4	29·3210	**6**	29·1359	**8**	28·9508	**10**	28·7657	**12**	28·5806	**14**	28·3955	**17**	29·2224
															15	29·4075		

YOGAS.

v Shortest interval in days from new moon to

Longitude at commencement. Deg.	Min.	Order	Names of yogas.	Days.	Order	Ordinarily Vaiśākha	Order	Ordinarily Jyeshṭha	Order	Ordinarily Āshāḍha	Order	Ordinarily Śrāvaṇa	Order	Ordinarily Bhādrapada	Order	Ordinarily Āśvina	Order	Ordinarily Kārttika
		27	Vaidhriti		**5**	0·8959	**9**	0·5515	**13**	0·2071	**18**	0·8042	**22**	0·4598	**26**	0·1154	**4**	0·7124
0	0	**1**	Vishkamba	0·9415	**6**	1·8374	**10**	1·4930	**14**	1·1486	**19**	1·7457	**23**	1·4013	**27**	1·0568	**5**	1·6539
13	20	**2**	Priti ...	1·8830	**7**	2·7789	**11**	2·4345	**15**	2·0901	**20**	2·6872	**24**	2·3427	**1**	1·9983	**6**	2·5954
26	40	**3**	Ayushmat	2·8245	**8**	3·7204	**12**	3·3760	**16**	3·0316	**21**	3·6286	**25**	3·2842	**2**	2·9398	**7**	3·5389
40	0	**4**	Saubhagya	3·7660	**9**	4·6619	**13**	4·3175	**17**	3·9730	**22**	4·5701	**26**	4·2257	**3**	3·8813	**8**	4·4784
53	20	**5**	Sobhana	4·7074	**10**	5·6034	**14**	5·2589	**18**	4·9145	**23**	5·5116	**27**	5·1672	**4**	4·8228	**9**	5·4199
66	40	**6**	Atiganda	5·6489	**11**	6·5449	**15**	6·2004	**19**	5·8560	**24**	6·4531	**1**	6·1087	**5**	5·7648	**10**	6·3614
80	0	**7**	Sukarman	6·5904	**12**	7·4863	**16**	7·1419	**20**	6·7975	**25**	7·3946	**2**	7·0502	**6**	6·7058	**11**	7·3029
93	20	**8**	Dhriti ...	7·5319	**13**	8·4278	**17**	8·0884	**21**	7·7395	**26**	8·3361	**3**	7·9917	**7**	7·6473	**12**	8·2444
106	40	**9**	Sula ...	8·4734	**14**	9·3693	**18**	9·0249	**22**	8·6805	**27**	9·2776	**4**	8·9332	**8**	8·5888	**13**	9·1858
120	0	**10**	Ganda	9·4149	**15**	10·3108	**19**	9·9664	**23**	9·6220	**1**	10·2191	**5**	9·8747	**9**	9·5302	**14**	10·1273
133	20	**11**	Vriddhi	10·3564	**16**	11·2523	**20**	10·9079	**24**	10·5635	**2**	11·1656	**6**	10·8162	**10**	10·4717	**15**	11·0688
146	40	**12**	Dhruva	11·2979	**17**	12·1938	**21**	11·8494	**25**	11·5050	**3**	12·1020	**7**	11·7576	**11**	11·4132	**16**	12·0103
160	0	**13**	Vyaghata	12·2394	**18**	13·1353	**22**	12·7909	**26**	12·4465	**4**	13·0435	**8**	12·6991	**12**	12·3547	**17**	12·9518
173	20	**14**	Harshana	13·1808	**19**	14·0768	**23**	13·7324	**27**	13·3879	**5**	13·9850	**9**	13·6406	**13**	13·2962	**18**	13·8933
186	40	**15**	Vajra ...	14·1223	**20**	15·0183	**24**	14·6738	**1**	14·3294	**6**	14·9265	**10**	14·5821	**14**	14·2377	**19**	14·8348
200	0	**16**	Siddhi	15·0638	**21**	15·9597	**25**	15·6153	**2**	15·2709	**7**	15·8680	**11**	15·5236	**15**	15·1792	**20**	15·7763
213	20	**17**	Vyatipata	16·0053	**22**	16·9012	**26**	16·5568	**3**	16·2124	**8**	16·8095	**12**	16·4651	**16**	16·1207	**21**	16·7181
226	40	**18**	Variyas	16·9468	**23**	17·8427	**27**	7·4983	**4**	17·1539	**9**	17·7510	**13**	17·4066	**17**	17·0622	**22**	17·6592
240	0	**19**	Parigha	17·8883	**24**	18·7842	**1**	18·4398	**5**	18·0954	**10**	18·6925	**14**	18·3481	**18**	18·0037	**23**	18·6007
253	20	**20**	Siva ...	18·8298	**25**	19·7257	**2**	19·3818	**6**	19·0369	**11**	19·6340	**15**	19·2896	**19**	18·9451	**24**	19·5422
266	40	**21**	Siddha	19·7713	**26**	20·6672	**3**	20·3228	**7**	19·9784	**12**	20·5755	**16**	20·2310	**20**	19·8866	**25**	20·4837
280	0	**22**	Sadhya	20·7128	**27**	21·6087	**4**	21·2643	**8**	20·9199	**13**	21·5169	**17**	21·1725	**21**	20·8281	**26**	21·4252
293	20	**23**	Śubha ...	21·6543	**1**	22·5502	**5**	22·2058	**9**	21·8614	**14**	22·4584	**18**	22·1140	**22**	21·7696	**27**	22·8667
306	40	**24**	Śukla ..	22·5957	**2**	23·4917	**6**	23·1473	**10**	22·8028	**15**	23·3999	**19**	23·0555	**23**	22·7111	**1**	23·3082
320	0	**25**	Brahman	23·5372	**3**	24·4332	**7**	24·0887	**11**	23·7443	**16**	24·3414	**20**	23·9970	**24**	23·6526	**2**	24·2497
333	20	**26**	Indra ...	24·4787	**4**	25·3746	**8**	25·0302	**12**	24·6858	**17**	25·2829	**21**	24·9385	**25**	24·5941	**3**	25·1912
346	40	**27**	Vaidhriti	25·4202	**5**	26·3161	**9**	25·9717	**13**	25·6273	**18**	26·2244	**22**	25·8800	**26**	25·5356	**4**	26·1327
					6	27·2576	**10**	26·9132	**14**	26·5688	**19**	27·1659	**23**	26·8215	**27**	26·4771	**5**	27·0741
					7	28·1991	**11**	27·8547	**15**	27·5103	**20**	28·1074	**24**	27·7630	**1**	27·4186	**6**	28·0156
					8	29·1406	**12**	28·7962	**16**	28·4518	**21**	29·0489	**25**	28·7045	**2**	28·3600	**7**	28·9571
									17	29·3933					**3**	29·3014		

q Days counted from April 1—

	Apr. 1	May 1	June 1	July 1	Aug 1	Sep. 1	Oct. 1	Nov. 1	Dec 1	Jan 1	Feb. 1	Mar. 1
April ...	1	31	62	92	123	154	184	215	245	276	307	335

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15	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
·2500	·2667	·2833	·3000	·3167	·3333	·3500	·3667	·3833	·4000	·4167	·4333	·4500	·4667	·4833	·5000
45	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
·7500	·7667	·7833	·8000	·8167	·8333	·8500	·8667	·8833	·9000	·9167	·9333	·9500	·9667	·9833	1·0000
22	**25**	**27**	**30**	**32**	**35**	**37**	**40**	**42**	**45**	**47**	**50**	**52**	**55**	**57**	**60**
·0061	·0069	·0075	·0083	·0089	·0097	·0103	·0111	·0117	·0125	·0130	·0139	·0144	·0153	·0158	·0167

TRAS.

moment of each nakshatra.

Order	Ordinarily Mārgaśirsha VIII	Order	Ordinarily Pausha IX	Order	Ordinarily Māgha X	Order	Ordinarily Phālguna XI	Order	Chaitra, when no Adhika Masa XII	Order	Chaitra, when there is Adhika Masa XIII
18	0·7037	**20**	0·5186	**22**	0·3385	**24**	0·1484	**27**	0·9753	**2**	0·7902
19	1·7156	**21**	1·5305	**23**	1·3454	**25**	1·1604	**1**	1·9872	**3**	1·8021
20	2·7275	**22**	2·5424	**24**	2·3574	**26**	2·1723	**2**	2·9991	**4**	2·8140
21	3·7384	**23**	3·5544	**25**	3·3693	**27**	3·1842	**3**	4·0110	**5**	3·8259
22	4·7514	**24**	4·5663	**26**	4·3812	**1**	4·1961	**4**	5·0229	**6**	4·8378
23	5·7633	**25**	5·5782	**27**	5·3931	**2**	5·2080	**5**	6·0348	**7**	5·8498
24	6·7752	**26**	6·5901	**1**	6·4050	**3**	6·2199	**6**	7·0468	**8**	6·8617
25	7·7871	**27**	7·6020	**2**	7·4169	**4**	7·2318	**7**	8·0587	**9**	7·8736
26	8·7990	**1**	8·6139	**3**	8·4288	**5**	8·2438	**8**	9·0706	**10**	8·8855
27	9·8109	**2**	9·6258	**4**	9·4408	**6**	9·2557	**9**	10·0825	**11**	9·8974
1	10·8228	**3**	10·6378	**5**	10·4527	**7**	10·2676	**10**	11·0944	**12**	10·9093
2	11·8348	**4**	11·6497	**6**	11·4646	**8**	11·2795	**11**	12·1063	**13**	11·9212
3	12·8467	**5**	12·6616	**7**	12·4765	**9**	12·2914	**12**	13·1182	**14**	12·9332
4	13·8586	**6**	13·6735	**8**	13·4884	**10**	13·3033	**13**	14·1802	**15**	13·9451
5	14·8705	**7**	14·6854	**9**	14·5003	**11**	14·3152	**14**	15·1421	**16**	14·9570
6	15·8824	**8**	15·6973	**10**	15·5122	**12**	15·3272	**15**	16·1540	**17**	15·9689
7	16·8943	**9**	16·7092	**11**	16·5242	**13**	16·3391	**16**	17·1659	**18**	16·9808
8	17·9062	**10**	17·7212	**12**	17·5361	**14**	17·3510	**17**	18·1778	**19**	17·9927
9	18·9181	**11**	18·7331	**13**	18·5480	**15**	18·3629	**18**	19·1897	**20**	19·0046
10	19·9301	**12**	19·7450	**14**	19·5599	**16**	19·3748	**19**	20·2016	**21**	20·0165
11	20·9420	**13**	20·7569	**15**	20·5718	**17**	20·3867	**20**	21·2135	**22**	21·0285
12	21·9539	**14**	21·7688	**16**	21·5837	**18**	21·3986	**21**	22·2255	**23**	22·0404
13	22·9658	**15**	22·7807	**17**	22·5956	**19**	22·4106	**22**	23·2374	**24**	23·0523
14	23·9777	**16**	23·7926	**18**	23·6076	**20**	23·4225	**23**	24·2493	**25**	24·0642
15	24·9896	**17**	24·8046	**19**	24·6195	**21**	24·4344	**24**	25·2612	**26**	25·0761
16	26·0015	**18**	25·8165	**20**	25·6314	**22**	25·4463	**25**	26·2731	**27**	26·0880
17	27·0135	**19**	26·8284	**21**	26·6433	**23**	26·4582	**26**	27·2850	**1**	27·0999
18	28·0254	**20**	27·8403	**22**	27·6552	**24**	27·4701	**27**	28·2969	**2**	28·1119
19	29·0373	**21**	28·8522	**23**	28·6671	**25**	28·4820	**1**	29·3089	**3**	29·1238
						26	29·4989				

ending moment of yogas.

Order	Ordinarily Mārgaśirsha	Order	Ordinarily Pausha	Order	Ordinarily Māgha	Order	Ordinarily Phālguna	Order	Chaitra when no Adhika Masa	Order	Chaitra when there is Adhika Masa
8	0·3680	**12**	0·0236	**17**	0·6207	**21**	0·2763	**26**	0·8784	**3**	0·5290
9	1·3095	**13**	0·9651	**18**	1·5622	**22**	1·2178	**27**	1·8149	**4**	1·4704
10	2·2510	**14**	1·9066	**19**	2·5037	**23**	2·1593	**1**	2·7563	**5**	2·4119
11	3·1925	**15**	2·8481	**20**	3·4452	**24**	3·1008	**2**	3·6978	**6**	3·3534
12	4·1340	**16**	3·7896	**21**	4·3867	**25**	4·0422	**3**	4·6393	**7**	4·2949
13	5·0755	**17**	4·7311	**22**	5·3281	**26**	4·9837	**4**	5·5808	**8**	5·2364
14	6·0170	**18**	5·6726	**23**	6·2696	**27**	5·9252	**5**	6·5223	**9**	6·1789
15	6·9585	**19**	6·6140	**24**	7·2111	**1**	6·8667	**6**	7·4638	**10**	7·1194
16	7·8899	**20**	7·5555	**25**	8·1526	**2**	7·8082	**7**	8·4053	**11**	8·0609
17	8·8414	**21**	8·4970	**26**	9·0941	**3**	8·7497	**8**	9·3468	**12**	9·0024
18	9·7829	**22**	9·4385	**27**	10·0356	**4**	9·6912	**9**	10·2883	**13**	9·9439
19	10·7244	**23**	10·3800	**1**	10·9771	**5**	10·6327	**10**	11·2298	**14**	10·8853
20	11·6659	**24**	11·3215	**2**	11·9186	**6**	11·5742	**11**	12·1712	**15**	11·8268
21	12·6074	**25**	12·2630	**3**	12·8601	**7**	12·5157	**12**	13·1127	**16**	12·7683
22	13·5489	**26**	13·2045	**4**	13·8015	**8**	13·4571	**13**	14·0542	**17**	13·7098
23	14·4604	**27**	14·1460	**5**	14·7430	**9**	14·3986	**14**	14·9957	**18**	14·6513
24	15·4319	**1**	15·0774	**6**	15·6845	**10**	15·3401	**15**	15·9372	**19**	15·5928
25	16·3733	**2**	16·0289	**7**	16·6260	**11**	16·2816	**16**	16·8787	**20**	16·5343
26	17·3148	**3**	16·9704	**8**	17·5675	**12**	17·2231	**17**	17·8202	**21**	17·4758
27	18·2563	**4**	17·9119	**9**	18·5090	**13**	18·1646	**18**	18·7617	**22**	18·4173
1	19·1978	**5**	18·8534	**10**	19·4505	**14**	19·1061	**19**	19·7032	**23**	19·3588
2	20·1393	**6**	19·7949	**11**	20·3920	**15**	20·0476	**20**	20·6446	**24**	20·3002
3	21·0808	**7**	20·7364	**12**	21·3335	**16**	20·9891	**21**	21·5861	**25**	21·2417
4	22·0223	**8**	21·6779	**13**	22·2750	**17**	21·9305	**22**	22·5276	**26**	22·1832
5	22·9638	**9**	22·6194	**14**	23·2164	**18**	22·8720	**23**	23·4691	**27**	23·1247
6	23·9053	**10**	23·5609	**15**	24·1579	**19**	23·8135	**24**	24·4101	**1**	24·0662
7	24·8468	**11**	24·5023	**16**	25·0994	**20**	24·7550	**25**	25·3521	**2**	25·0087
8	25·7882	**12**	25·4438	**17**	26·0409	**21**	25·6965	**26**	26·2936	**3**	25·9492
9	26·7297	**13**	26·3853	**18**	26·9824	**22**	26·6380	**27**	27·2351	**4**	26·8907
10	27·6712	**14**	27·3268	**19**	27·9239	**23**	27·5795	**1**	28·1766	**5**	27·8322
11	28·6127	**15**	28·2683	**20**	28·8654	**24**	28·5210	**2**	29·1181	**6**	28·7736
		16	29·2098			**25**	29·4625				

Annual correction.

Argument.—Date of appearance of 1st new moon in each solar year according to Table X.

The correction corresponding to the decimal portion of the argument should be subtracted from the nakshatra or yoga correction corresponding to the integral portion, thus the nakshatra correction corresponding to an argument 28·53 = 0·11 *minus* ·04 = 0·07.

NAKSHATRAS.

Arg.	Corrn. t	Arg.	Corrn. u	Arg.	Corrn. u	Arg.	Corrn. u	Arg.	Corrn. u
0	2·20890	**·01**	·00075	**·30**	·02244	**·59**	·04418	**·88**	·06582
1	2·13410	**·02**	·00150	**·31**	·02319	**·60**	·04488	**·89**	·06657
2	2·05930	**·03**	·00224	**·32**	·02394	**·61**	·04563	**·90**	·06732
3	1·98450	**·04**	·00299	**·33**	·02468	**·62**	·04638	**·91**	·06807
4	1·90970	**·05**	·00374	**·34**	·02543	**·63**	·04712	**·92**	·06882
5	1·83490	**·06**	·00449	**·35**	·02618	**·64**	·04787	**·93**	·06956
6	1·76010	**·07**	·00524	**·36**	·02693	**·65**	·04862	**·94**	·07031
7	1·68531	**·08**	·00598	**·37**	·02768	**·66**	·04937	**·95**	·07106
8	1·61049	**·09**	·00673	**·38**	·02842	**·67**	·05012	**·96**	·07181
9	1·53569	**·10**	·00748	**·39**	·02917	**·68**	·05086	**·97**	·07256
10	1·46089	**·11**	·00823	**·40**	·02992	**·69**	·05161	**·98**	·07330
11	1·38609	**·12**	·00898	**·41**	·03067	**·70**	·05236	**·99**	·07405
12	1·31129	**·13**	·00972	**·42**	·03142	**·71**	·05311		
13	1·23649	**·14**	·01047	**·43**	·03216	**·72**	·05386		
14	1·16169	**·15**	·01122	**·44**	·03291	**·73**	·05460		
15	1·08689	**·16**	·01197	**·45**	·03366	**·74**	·05535		
16	1·01209	**·17**	·01272	**·46**	·03441	**·75**	·05610		
17	0·93729	**·18**	·01346	**·47**	·03516	**·76**	·05685		
18	0·86249	**·19**	·01421	**·48**	·03590	**·77**	·05760		
19	0·78769	**·20**	·01496	**·49**	·03665	**·78**	·05834		
20	0·71288	**·21**	·01571	**·50**	·03740	**·79**	·05909		
21	0·63808	**·22**	·01646	**·51**	·03815	**·80**	·05984		
22	0·56328	**·23**	·01720	**·52**	·03890	**·81**	·06059		
23	0·48848	**·24**	·01795	**·53**	·03964	**·82**	·06134		
24	0·41368	**·25**	·01870	**·54**	·04039	**·83**	·06208		
25	0·33888	**·26**	·01945	**·55**	·04114	**·84**	·06283		
26	0·26408	**·27**	·02020	**·56**	·04189	**·85**	·06358		
27	0·18928	**·28**	·02094	**·57**	·04264	**·86**	·06433		
28	0·11448	**·29**	·02169	**·58**	·04338	**·87**	·06508		
29	0·03968								

YOGAS.

See note on ANNUAL CORRECTION *supra*.

Arg.	w	Arg.	x	Arg.	x	Arg.	x	Arg.	x
0	4·11036	**·01**	·00139	**·30**	·04176	**·59**	·08212	**·88**	·12249
1	3·97117	**·02**	·00278	**·31**	·04315	**·60**	·08351	**·89**	·12388
2	3·83198	**·03**	·00417	**·32**	·04454	**·61**	·08491	**·90**	·12527
3	3·69279	**·04**	·00557	**·33**	·04593	**·62**	·08630	**·91**	·12666
4	3·55360	**·05**	·00696	**·34**	·04732	**·63**	·08769	**·92**	·12805
5	3·41441	**·06**	·00835	**·35**	·04872	**·64**	·08908	**·93**	·12945
6	3·27522	**·07**	·00974	**·36**	·05011	**·65**	·09047	**·94**	·13084
7	3·13603	**·08**	·01113	**·37**	·05150	**·66**	·09186	**·95**	·13223
8	2·99684	**·09**	·01253	**·38**	·05289	**·67**	·09326	**·96**	·13362
9	2·85765	**·10**	·01392	**·39**	·05428	**·68**	·09465	**·97**	·13601
10	2·71846	**·11**	·01530	**·40**	·05568	**·69**	·09604	**·98**	·13641
11	2·57927	**·12**	·01670	**·41**	·05707	**·70**	·09743	**·99**	·13780
12	2·44008	**·13**	·01809	**·42**	·05846	**·71**	·09882		
13	2·30089	**·14**	·01949	**·43**	·05985	**·72**	·10022		
14	2·16170	**·15**	·02088	**·44**	·06124	**·73**	·10161		
15	2·02251	**·16**	·02227	**·45**	·06263	**·74**	·10300		
16	1·88332	**·17**	·02366	**·46**	·06493	**·75**	·10439		
17	1·74413	**·18**	·02505	**·47**	·06542	**·76**	·10578		
18	1·60494	**·19**	·02645	**·48**	·06681	**·77**	·10798		
19	1·46575	**·20**	·02784	**·49**	·06820	**·78**	·10837		
20	1·32656	**·21**	·02923	**·50**	·06959	**·79**	·10976		
21	1·18737	**·22**	·03063	**·51**	·07098	**·80**	·11115		
22	1·04818	**·23**	·03201	**·52**	·07238	**·81**	·11274		
23	0·90899	**·24**	·03340	**·53**	·07377	**·82**	·11413		
24	0·76980	**·25**	·03480	**·54**	·07516	**·83**	·11553		
25	0·63061	**·26**	·03619	**·55**	·07655	**·84**	·11692		
26	0·49142	**·27**	·03758	**·56**	·07795	**·85**	·11831		
27	0·35223	**·28**	·03897	**·57**	·07934	**·86**	·11970		
28	0·21304	**·29**	·04036	**·58**	·08073	**·87**	·12109		
29	0·07385								

y Calendar to be used with Table II, as directed in specimen problems, for ascertaining the A.D. month and day corresponding to any solar date, lunar tithi, nakshatra, yoga or karana.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
Vaiśākha.			
0	·9843	1	0·984
1	·9687	2	1·969
2	·9530	3	2·953
3	·9374	4	3·937
4	·9217	5	4·921
5	·9061	6	5·906
6	·8904	7	6·890
7	·8748	8	7·875
8	·8592	9	8·859
9	8435	10	9·843
10	8279	11	10·827
11	8122	12	11·812
12	·7966	13	12·797
13	·7809	14	13·781
14	7652	15	14·765
15	7496	**1**	15·750
16	·7340	**2**	16·734
17	·7183	**3**	17·718
18	·7027	**4**	18·703
19	·6870	**5**	19·687
20	6714	**6**	20·671
21	·6557	**7**	21·656
22	6401	**8**	22·640
23	·6244	**9**	23·624
24	·6088	**10**	24·609
25	·5932	**11**	25·593
26	·5775	**12**	26·577
27	5619	**13**	0·007
28	·5462	**14**	0·992
29	5306	**15**	1·976
Jyeshṭha.			
30	·5149	1	2·960
31	4993	2	3·945
32	·4836	3	4·929
33	·4680	4	5·913
34	·4523	5	6·898
35	4367	6	7·882
36	4210	7	8·866
37	4054	8	9·851
38	3898	9	10·835
39	3741	10	11·819
40	3585	11	12·804
41	3428	12	13·788
42	3272	13	14·773
43	3115	14	15·757
44	·2959	15	16·741
45	·2802	**1**	17·726
46	·2646	**2**	18·710
47	·2489	**3**	19·694
48	2333	**4**	20·679
49	·2176	**5**	21·663
50	·2020	**6**	22·647
51	1863	**7**	23·632
52	·1707	**8**	24·616
53	1551	**9**	25·600
54	·1394	**10**	26·585
55	·1238	**11**	0·015
56	·1081	**12**	0·999
57	·0925	**13**	1·983
58	·0768	**14**	2·968
59	·0612	**15**	3·952
Āshāḍha.			
60	·0455	1	4·936
61	·0299	2	5·921
62	·0142	3	6·905
62	·9986	4	7·889
63	·9829	5	8·874
Āshāḍha—*cont.*			
64	·9673	6	9·858
65	9516	7	10·842
66	9360	8	11·827
67	·9203	9	12·811
68	9047	10	13·795
69	8891	11	14·780
70	8734	12	15·764
71	8578	13	16·749
72	8421	14	17·733
73	8265	15	18·717
74	·8108	**1**	19·702
75	·7952	**2**	20·686
76	7795	**3**	21·670
77	7638	**4**	22·655
78	7482	**5**	23·639
79	7326	**6**	24·623
80	7169	**7**	25·608
81	7013	**8**	26·592
82	6856	**9**	0·022
83	·6700	**10**	1·006
84	6543	**11**	1·991
85	6387	**12**	2·975
86	6231	**13**	3·959
87	6074	**14**	4·944
88	·5918	**15**	5·928
Śrāvaṇa.			
89	·5761	1	6·912
90	5605	2	7·897
91	5448	3	8·881
92	5292	4	9·865
93	5135	5	10·850
94	·4979	6	11·834
95	·4822	7	12·818
96	·4666	8	13·803
97	·4509	9	14·787
98	4353	10	15·771
99	·4196	11	16·756
100	4040	12	17·740
101	3883	13	18·725
102	·3727	14	19·709
103	·3571	15	20·693
104	·3414	**1**	21·678
105	3258	**2**	22·662
106	3101	**3**	23·646
107	·2945	**4**	24·631
108	·2788	**5**	25·615
109	2632	**6**	26·599
110	2475	**7**	0·029
111	2319	**8**	1·013
112	·2162	**9**	1·998
113	·2006	**10**	2·982
114	·1849	**11**	3·966
115	·1693	**12**	4·951
116	·1536	**13**	5·935
117	1380	**14**	6·920
118	1223	**15**	7·904
Bhādrapada.			
119	·1067	1	8·888
120	·0911	2	9·873
121	·0754	3	10·857
122	0598	4	11·841
123	·0441	5	12·826
124	·0285	6	13·810
125	·0128	7	14·794
125	·9972	8	15·779
126	9815	9	16·763
127	·9659	10	17·747
Bhādrapada—*cont.*			
128	·9502	11	18·732
129	·9346	12	19·716
130	·9189	13	20·700
131	9033	14	21·685
132	·8876	15	22·669
133	8720	**1**	23·654
134	·8563	**2**	24·638
135	·8407	**3**	25·622
136	·8251	**4**	26·607
137	8094	**5**	0·036
138	7938	**6**	1·021
139	·7781	**7**	2·005
140	·7625	**8**	2·989
141	·7468	**9**	3·974
142	7312	**10**	4·958
143	7155	**11**	5·942
144	6999	**12**	6·927
145	6842	**13**	7·911
146	6686	**14**	8·896
147	6529	**15**	9·880
Āśvina.			
148	6373	1	10·864
149	·6216	2	11·849
150	6060	3	12·833
151	·5904	4	13·817
152	5747	5	14·802
153	5591	6	15·786
154	5434	7	16·770
155	5278	8	17·755
156	·5121	9	18·739
157	·4965	10	19·723
158	·4808	11	20·708
159	·4652	12	21·692
160	·4495	13	22·676
161	4339	14	23·661
162	·4182	15	24·645
163	4026	**1**	25·630
164	3869	**2**	26·614
165	·3713	**3**	0·044
166	·3556	**4**	1·028
167	3400	**5**	2·012
168	·3244	**6**	2·997
169	·3087	**7**	3·981
170	·2931	**8**	4·965
171	·2774	**9**	5·950
172	·2618	**10**	6·934
173	2461	**11**	7·918
174	2305	**12**	8·903
175	·2148	**13**	9·887
176	·1992	**14**	10·872
177	1835	**15**	11·856
Kārttika.			
178	·1679	1	12·840
179	1522	2	13·825
180	1366	3	14·809
181	·1209	4	15·793
182	·1053	5	16·778
183	·0896	6	17·762
184	0740	7	18·746
185	·0584	8	19·731
186	·0427	9	20·715
187	·0271	10	21·699
188	·0114	11	22·684
188	·9958	12	23·668
189	·9801	13	24·652
190	9645	14	25·637
191	·9488	15	26·621
Kārttika—*cont.*			
192	·9332	**1**	0·051
193	·9175	**2**	1·035
194	·9019	**3**	2·020
195	·8862	**4**	3·004
196	·8706	**5**	3·988
197	·8549	**6**	4·973
198	·8393	**7**	5·957
199	8236	**8**	6·941
200	·8080	**9**	7·926
201	7924	**10**	8·910
202	7767	**11**	9·894
203	7611	**12**	10·879
204	7454	**13**	11·863
205	·7298	**14**	12·848
206	·7141	**15**	13·832
Mārgaśīrsha.			
207	6985	1	14·816
208	·6828	2	15·801
209	6672	3	16·785
210	·6515	4	17·769
211	·6359	5	18·754
212	·6202	6	19·738
213	6046	7	20·722
214	5889	8	21·707
215	5733	9	22·691
216	5576	10	23·675
217	·5420	11	24·660
218	·5264	12	25·644
219	5107	13	26·628
220	4951	14	0·058
221	·4794	15	1·043
222	4638	**1**	2·027
223	4481	**2**	3·011
224	4325	**3**	3·996
225	·4168	**4**	4·980
226	4012	**5**	5·964
227	3855	**6**	6·949
228	3699	**7**	7·933
229	3542	**8**	8·917
230	3386	**9**	9·902
231	3229	**10**	10·886
232	3073	**11**	11·870
233	2916	**12**	12·855
234	2760	**13**	13·839
235	·2604	**14**	14·824
236	·2447	**15**	15·808
Pausha.			
237	·2291	1	16·792
238	·2134	2	17·777
239	1978	3	18·761
240	·1821	4	19·745
241	1665	5	20·730
242	·1508	6	21·714
243	1352	7	22·698
244	1195	8	23·683
245	·1039	9	24·667
246	·0882	10	25·651
247	·0726	11	26·636
248	·0569	12	0·065
249	·0413	13	1·050
250	·0257	14	2·034
251	·0108	15	3·019
251	·9944	**1**	4·003
252	·9787	**2**	4·987
253	·9631	**3**	5·972
254	·9474	**4**	6·956
255	·9318	**5**	7·940
Pausha—*cont.*			
256	·9161	**6**	8·925
257	·9005	**7**	9·909
258	·8848	**8**	10·893
259	·8692	**9**	11·878
260	·8535	**10**	12·862
261	·8379	**11**	13·846
262	·8222	**12**	14·831
263	·8066	**13**	15·815
264	·7909	**14**	16·799
265	·7753	**15**	17·784
Māgha.			
266	·7597	1	18·768
267	·7440	2	19·753
268	·7284	3	20·737
269	·7127	4	21·721
270	·6971	5	22·706
271	6814	6	23·690
272	·6658	7	24·674
273	6501	8	25·659
274	·6345	9	26·643
275	·6188	10	0·078
276	·6032	11	1·057
277	5875	12	2·041
278	·5719	13	3·026
279	5562	14	4·010
280	·5406	15	4·995
281	·5249	**1**	5·979
282	·5093	**2**	6·963
283	4937	**3**	7·948
284	4780	**4**	8·932
285	4624	**5**	9·916
286	4467	**6**	10·901
287	4311	**7**	11·885
288	·4154	**8**	12·869
289	·3998	**9**	13·854
290	3841	**10**	14·838
291	3685	**11**	15·822
292	·3528	**12**	16·807
293	·3372	**13**	17·791
294	·3215	**14**	18·775
295	3059	**15**	19·760
Phālguna.			
296	·2902	1	20·744
297	·2746	2	21·729
298	·2589	3	22·713
299	·2433	4	23·697
300	·2277	5	24·682
301	·2120	6	25·666
302	1964	7	26·650
303	1807	8	0·080
304	·1651	9	1·064
305	·1494	10	2·049
306	·1338	11	3·033
307	·1181	12	4·017
308	·1025	13	5·002
309	·0868	14	5·986
310	·0712	15	6·971
311	·0555	**1**	7·955
312	·0399	**2**	8·939
313	·0242	**3**	9·924
314	·0086	**4**	10·908
314	·9929	**5**	11·892
315	·9773	**6**	12·877
316	·9617	**7**	13·861
317	·9460	**8**	14·845
318	·9304	**9**	15·830
319	·9147	**10**	16·814
Phālguna—*cont.*			
320	·8991	**11**	17·798
321	·8834	**12**	18·783
322	·8678	**13**	19·767
323	·8521	**14**	20·751
324	·8365	**15**	21·736
Chaitra (when there is no adhika masa).			
325	8208	1	22·720
326	·8052	2	23·705
327	·7895	3	24·689
328	·7739	4	25·673
329	·7582	5	26·658
330	·7426	6	0·087
331	·7269	7	1·072
332	·7113	8	2·056
333	·6957	9	3·040
334	·6800	10	4·025
335	6644	11	5·009
336	6487	12	5·993
337	6331	13	6·978
338	·6174	14	7·962
339	·6018	15	8·947
340	·5861	**1**	9·931
341	·5705	**2**	10·915
342	·5548	**3**	11·900
343	·5392	**4**	12·884
344	·5235	**5**	13·868
345	5079	**6**	14·853
346	·4922	**7**	15·837
347	·4766	**8**	16·821
348	·4610	**9**	17·806
349	4453	**10**	18·790
350	4297	**11**	19·774
351	4140	**12**	20·759
352	·3984	**13**	21·743
353	·3827	**14**	22·727
354	·3671	**15**	23·712
Chaitra (when there is adhika masa).			
355	·3514	1	24·696
356	·3358	2	25·681
357	·3201	3	26·665
358	·3045	4	0·095
359	2888	5	1·079
360	·2732	6	2·063
361	·2575	7	3·048
362	·2419	8	4·032
363	·2262	9	5·016
364	·2106	10	6·001
365	·1950	11	6·985
366	·1793	12	7·969
367	·1637	13	8·954
368	·1480	14	9·938
369	·1324	15	10·923
370	·1167	**1**	11·907
371	·1011	**2**	12·891
372	·0854	**3**	13·876
373	·0698	**4**	14·860
374	·0541	**5**	15·844
375	·0385	**6**	16·829
376	·0228	**7**	17·813
377	·0072	**8**	18·797
377	·9915	**9**	19·782
378	·9759	**10**	20·766
379	·9602	**11**	21·750
380	·9446	**12**	22·735
381	·9290	**13**	23·719
382	·9133	**14**	24·703
383	·8977	**15**	25·688

BRAHMA SIDDHĀNTA AND SIDDHĀNTA ŚIROMAṆI EYE-TABLE—Specimen problems.

This eye-table **alone** will enable any one to solve correctly, to four places of decimals of a day and by a single working, any problem in *solar dates, nakshatras* or *week days*, for 1,600 years, i.e., from A.D. 400 to A.D 2000 by the Brahma Siddhānta and from A.D. 900 to A.D. 2000 by the Siddhānta Śiromaṇi. The tables of equations are given to two places of decimals in the abridged sections **e** to **i** of the eye-table—see next page—and to four places of decimals in the unabridged sections **e** to **i** of the same table, pages 187 to 194 below.

The computation of the ending moment, whether of a tithi or of a nakshatra or of a yoga, always comprises four processes: (1) to find the mean ending moment, (2) to find the anomaly or anomalies for that moment, (3) to find the equation or equations corresponding to the anomaly or anomalies, and (4) to add together the mean ending moment and the equation or equations.

Problem I.—Required to find the ending moment, by Brahma Siddhānta, of Āshāḍha, Śukḷa 12, A.D. 484 *Note stages* **(1)** to **(11)**.

Commencement of solar year. Col. 1.	Days in solar year or sun's anomaly. Col. 2.	Moon's anomaly. Col 3.
A.D. 400 ... ... Mar 16 61677 **k** 84 years ... .. ·70875 **n** A.D. 484 ... .. Mar 17·32552 **(1)** *N.B.*—This, by itself, is a valuable piece of information, giving the English year, month, date and fraction of day on which a particular Indian solar year between A D 400 and A D 2000 commenced, and it may be had, in a few seconds, from the eye-table, for any one of 1,600 years.	1st new moon in solar year { A.D 400 .. 24 70841 **l** 84 years .. + 56601 **o** A D. 484 25·2744 **(2)** *Add* for Āshāḍha new moon + 59 0612 **b** „ 12 tithis + 11 8122 **d** 96 1478 **(4)** *Add* sum of ☉'s & ☾'s eqns. + 3641 **(9)** 96 5119	20 4106 **m** 13 4989 **p** 25 2744 **(2)** (1st N.M. in S.Y.). 59 1839 – 55 1090 (2 anom months). 4·075 **(3)** (☾'s An. at 1st N.M. in S Y.). +3 952 **c** +11 812 **d** 19 839 **(5)** – 047 (☉'s equation) **h (6)** 19 792 **(7)**
Note how stages **(1)**, **(2)**, **(3)**, **(4)**, **(5)**, **(6)**, **(7)**, **(8)** and **(9)** are successively arrived at and then add **(4)**, **(9)** and **(1)**, as shown in column 2.	*Add* commencement of solar year, A D. 484 . .. Mar 17 3255 **(1)** Mar 113 8374 **(10)**	☉'s eqn for 96 15 d. **(4)** + 41 [☾'s eqn for 19·84 d. **(5)**] or 96 56 d. = – ·0466 **h (6)** ☾'s eqn for 19 792 d **(7)** = + ·4107 **e (8)** Sum of ☉'s and ☾'s eqns. + ·3641 **(9)**

The 93rd day from March 1 is, by eye-table, June 1, **q** ∴ the 113th day from March 1 is, by eye-table, June 21.

For the week day of 21 June, A.D. 484, we have, by eye-table **j**, 2 + 0 + 3 + 21 = 26, 26, divided by 7, leaves remainder 5 = **Thursday** ... and ·8374 of a day is 50 ghaṭikas and 15 palas

(11) .. Tithi ended on Thursday **21 June, A.D. 484, at 50 ghaṭikas 15 palas** after mean sunrise, which is identical with Mr Dikshit's result in Introduction to *Fleet's Gupta Inscriptions* (1888), p 157.

Problem II—Required the ending moment by Siddhānta Śiromaṇi of the same tithi, Āshāḍha, Śukḷa 12, A D 484.

The process and details are the same as those given in example I for a tithi by Brahma Siddhānta, except that (1) **k, l, m** are slightly different as will be seen from the eye-table, (2) **o** and **p** present minute differences, also explained in the eye-table and (3) the sun's anomaly in days has to be diminished by the following quantities, before finding out the equation For each Kaliyuga century in the first line below, make the corresponding deduction from ☉'s An. shown in the second line —

K Y	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000
	– 73	– 76	– 79	– 82	– 85	– 88	– 91	– 94	– ·97	– 1 00	– 1 03	– 1 06	– 1·09	– 1 12	– 1 15	– 1 18	1 21	– 1 24	– 1·27	– 1·30	– 1·33 days.

For K.Y 3585 = A.D. 484, we deduct ·90 day from sun's anomaly, according to the above table

The working for a Siddhānta Śiromaṇi tithi is as follows:—

Commencement of solar year. Col. 1.	☉'s anomaly Col. 2.	☾'s anomaly. Col. 3.
A.D 400 ... . Mar 16 6112 **k** 84 years ... ... ·7087 **n** A.D. 484 ... . Mar. 17·3119 **(1)** ☉'s eqn. for 95·71 d, i.e., for 96 20 d **(4)** – 0·90 d.* + ·41 d. [☾'s eqn. for 19·818 d.] .. – ·0438 **h (5)** *☉'s An. 96 20 d. **(4)** should be diminished by 0·90 d. for K.Y. 3500 to 3600 acc to Siddhānta Śiromaṇi See note supra. ☾'s eqn. for 19·774 d. **(6)** ... . = + ·4105 **e (7)** *Add* **(5)** and **(7)** ... + ·3667 **(8)** ...	24 7918 **l** 0 5672 **o** 25 3290 **(2)** *Add* for Āshādha new moon ... 59 0612 **b** *Add* for 12 tithis ... ... 11 8122 **d** *Add* **(2)**, **b** and **d** 96·2024 **(4)** ←——— ... + ·3667 **(8)** Mar 17 3199 **(1)** *Add* **(4)**, **(8)** and **(1)** .. Mar 113 8890 **(9)**	20 3880 **m** 13 4971 **p** 25·3290 **(2)** 59 1641 [**m** + **p** + **(2)**] – 55 110 (2 anom. months) 4 054 **(3)** (☾'s An. at 1st N.M. S.Y.) 3 952 **c** 11·812 **d** 19 818 [**(3)** + **c** + **d**]. ☾'s eqn. for this is + ·41. – 044 [☉'s eqn. **h (5)**] 19 774 **(6)** Note how stages **(1)**, **(2)**, **(3)**, **(4)**, **(5)**, **(6)**, **(7)**, **(8)** are successively arrived at, and then add **(1)**, **(4)** and **(8)**, as shown in column 2

Result **(9)**, Mar. 113 8890, reduced to day of month, ghaṭikas and palas, becomes Thursday **(j) June 21**, **q 53 ghaṭikas, 21 palas** after mean sunrise, which is identical with Mr. Dikshit's result in Introduction to *Fleet's Gupta Inscriptions*, p. 157 .. ... **(10)**

Problem III.—Required the ending moment by Brahma Siddhānta of No 17 Anurādhā Nakshatra in June, A.D. 484. *Stages of work* **I** to **IV**

	Days.	☾'s Anom. days.
Āshāḍa new moon, A.D. 484 (Table II, p 218, and footnote)	June 9·66	4·07 + 3 95 } [**(3)** + **c**]
Shortest interval from Āshāḍha new moon to No 17 Anurādhā Nakshatra	+ 10·53 **s**	+ 10·53 **s**
Nak. correction for A.D. 484–85 is that corresponding to 25 27 = 0 84 **(t)** *minus* ·02 **(u)** .	+ ·32 **I**	+ 82 **(I)**
	June 20·52 **(III)**	18 87 **(II)**
(f) ☾'s Naksh. eqn. for Anom of 18·82 **(II)** days, is	+ ·34 **(f)** June 20·86 **(IV)**	

(IV) Nakshatra Anurādhā (No. 17) ended on Wednesday **j** 20 June, A D 484, at 86, i.e., 52 ghat **(r)** after mean sunrise.

Problem IV.—Required the ending moment by Brahma Siddhānta of Yoga Śukḷa (No 24) in June, A D. 484. *Stages of work* **A** to **G**.

	Days.	☉'s Anom days.	☾'s Anom. days.
Āshāḍha new moon, A.D. 484 (Table II, p. 218, and footnote)	June 9·66	25 28 **(2)** + 59 06 **b**	4·07 **(3)** + 3·95 **c**
Shortest interval from Āshāḍha new moon to No 24 Yoga Śukḷa **v**	+ 10 57	+ 10 57 **v**	+ 10·57 **v**
Yoga correction for A.D. 484–85 is that corresponding to an argument of 25·27 days, i.e., 0·63 **w** *minus* ·04 **x** day	= + 0·59 **(A)**	+ 0·59 **(A)**	+ 0 59 **(A)** + 19·18
Sun's yoga equation **(i)** for 95·49 d. + ·34 (☾'s eqn) d. = + ·04 d **i** ...	June 20 83 **(B)**	95·50 **(C)**	+ 0·04 **(i)** ☉'s Yoga equation.
Moon's yoga equation for 19·22 days **(D)** is + ·34 d. = + ·34 d. **g**.			19·22 **(D)**
Sum of sun's and moon's yoga equations **i** + **g** = + ·38 **(F)**	+ ·38 **(F)**		

Ending moment of yoga No. 24 Śukḷa [(B) + (F)] = June 21·21 = 13 ghaṭikas (r) after mean sunrise on Thursday (j) 21 June, A.D. 484 (G).

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EYE-TABLE FOR BRAHMA SIDDHĀNTA

NOTE.—The different sections of this Table are lettered in order from a to y and All the figures, except where otherwise indicated, represent days and fractions of a day.

z Order of signs of zodiac or rāśis and ☉'s Long. at commencement.	1 ... 0°	2 ... 30°	3 ... 60°	4 ... 90°
Bengal solar month ...	Vaiśākha	Jyeshṭha	Āshāḍha	Śrāvaṇa
Tamil and Malayālam solar months; also names of rāśis ...	Mēsha	Vṛishabha	Mithuna	Karkaṭaka
Tamil solar months ...	Chittirai	Vaigāśi	Āni	Āḍi
a Moment of sankrānti in days of solar year, and decimals of a day (**Br. Sid.**) ...	0·0	30·9316	62·3456	93·9677
" " " (**Sid. Śirom.**)	0·0	30·9109	62·3111	93·9312
English date corresponding to each sankrānti (A.D. 1900) ...	Apr. 11	May 12	June 11	July 14
Lunar month: each month commences *before* sankrānti noted in *next* column ...	(1) *Vaiśākha*	(2) *Jyeshṭha*	(3) *Āshāḍha*	(4) *Śrāvaṇa*
b Increase in days, (1) of lunar months, (2) of sun's anomaly ...		29·5306	59·0612	88·5918
c " of ☾'s An. when interval between Mēsha sank and 1st N M. in sol. yr. is 0·00 day.		1·976	3·952	5·928

Tithi equivalents in days and

d Tithi equivalent in days ...	**1**	**2**	**3**	**4**	**5**
	·9843	1·9687	2·9531	3·9374	4·9218
	16	**17**	**18**	**19**	**20**
	15·7496	16·7340	17·7182	18·7027	19·6871

e, f, g Moon's equation of the centre and moon's anomaly in days and

	·00	**·01**	**·02**	**·03**	**·04**	**·05**	**·06**	**·07**	**·08**	**·09**	**·10**	**·11**	**·12**	**·13**	**·14**	**·15**	**·16**	**·17**	**·18**	**·19**	**·20**
−	0·00	0·12	0·24	0·35	0·46	0·58	0·70	0·82	0·94	1·06	1·17	1·29	1·42	1·53	1·66	1·79	1·92	2·04	2·16	2·29	2·41
−	13·78	13·68	13·58	13·49	13·39	13·29	13·20	13·10	13·00	12·90	12·80	12·70	12·60	12·50	12·40	12·29	12·19	12·08	11·98	11·87	11·76
+	13·78	13·87	13·97	14·07	14·16	14·26	14·36	14·45	14·55	14·65	14·75	14·85	14·95	15·05	15·16	15·26	15·37	15·47	15·58	15·69	15·79
+	27·55	27·44	27·32	27·20	27·09	26·97	26·85	26·74	26·62	26·50	26·38	26·26	26·14	26·02	25·89	25·77	25·64	25·52	25·39	25·27	25·14
−	0·00	0·12	0·25	0·37	0·50	0·62	0·75	0·87	1·00	1·13	1·26	1·39	1·52	1·65	1·79	1·92	2·06	2·19	2·33	2·47	2·61
−	13·78	13·67	13·57	13·46	13·36	13·25	13·15	13·04	12·94	12·83	12·72	12·61	12·50	12·38	12·27	12·15	12·04	11·92	11·80	11·68	11·56
+	13·78	13·88	13·98	14·09	14·19	14·30	14·40	14·51	14·62	14·73	14·84	14·95	15·06	15·17	15·29	15·40	15·52	15·63	15·75	15·87	15·99
+	27·55	27·43	27·31	27·18	27·06	26·93	26·81	26·68	26·55	26·42	26·29	26·16	26·03	25·90	25·77	25·63	25·50	25·36	25·22	25·08	24·94
−	0·00	0·13	0·27	0·40	0·53	0·67	0·80	0·94	1·07	1·21	1·35	1·49	1·63	1·78	1·92	2·06	2·21	2·36	2·50	2·66	2·82
−	13·78	13·66	13·55	13·44	13·32	13·21	13·09	12·98	12·86	12·74	12·63	12·51	12·38	12·26	12·14	12·01	11·89	11·76	11·63	11·50	11·36
+	13·78	13·89	14·00	14·12	14·23	14·35	14·46	14·57	14·69	14·81	14·93	15·04	15·17	15·29	15·42	15·54	15·66	15·79	15·92	16·05	16·20
+	27·55	27·42	27·29	27·15	27·02	26·89	26·75	26·62	26·48	26·34	26·20	26·07	25·92	25·78	25·64	25·49	25·35	25·20	25·05	24·90	24·74

h For Tithis. Sun's equation of the centre and sun's anomaly in days of the solar

+·178	**+·175**	**+·17**	**+·16**	**+·15**	**+·14**	**+·13**	**+·12**	**+·11**	**+·10**	**+·09**	**+·08**	**+·07**	**+·06**	**+·05**	**+·04**	**+·03**	**+·02**	**+·01**	**+·00**
359	1·16	8	16	23	29	34	38	42	47	50	54	58	61	65	68	71	75	78	81·28
351	344	337	328	322	316	311	307	302	298	294	291	287	284	280	277	274	270	267	263·86

i For yogas.—Sun's equation	**−·154**	**−·153**	**−·15**	**−·14**	**−·13**	**−·12**	**−·11**	**−·10**	**−·09**	**−·08**	**−·07**	**−·06**	**−·05**	**−·04**	**−·03**
" Anomaly in days of solar year	355·2	361	3	15	23	29	35	40	45	49	54	58	62	66	70
	355·32	350	343	331	323	316	310	305	300	296	291	287	283	279	275

j Perpetual almanac for European calendar

[*N.B.*—Heavy type means week-day, Sunday being **1**, Monday **2**, etc.]

	1	**2**	**3**	**4**	**5**	**6**	**7** or **0**
Centuries B.C.	3001	3101	3201				
	2301	2401	2501	2601	2701	2801	2901
	1601	1701	1801	1901	2001	2101	2201
	901	1001	1101	1201	1301	1401	1501
	201	301	401	501	601	701	801
						1	101
Centuries A.D. old style.	500	400	300	200	100	0	
	1200	1100	1000	900	800	700	600
			1700	1600	1500	1400	1300
Centuries A.D. new style.	(1600)	1900		1800		1700	
	2000	2300		2200		2300	

N.B.—B.C. years should be made positive thus 44 B.C. is 57th year of century beginning with 101 B.C.—see page 14 of the Text.

N.B.—Old Style ceased in continental countries (exc. Russia) on 4–10–1582 and New Style began on 15–10–1582, 10 days being dropped. In United Kingdom, New Style began on 14–9–1752, 11 days being dropped.

Odd years in a Century.

1	**2**	**3**	**4**	**5**	**6**	**7** or **0**	**1**	**2**	**3**	**4**	**5**	**6**	**7** or **0**
1	2	3	...	4	5	6		52	53	54	55		56
7	...	8	9	10	11	...	57	58	59	...	60	61	62
12	13	14	15	...	16	17	63	.	64	65	66	67	...
18	19	...	20	21	22	23	68	69	70	71	...	72	73
...	24	25	26	27	...	28	74	75	...	76	77	78	79
29	30	31	...	32	33	34	...	80	81	82	83		84
35	...	36	37	38	39	...	85	86	87	...	88	89	90
40	41	42	43	...	44	45	91	...	92	93	94	95	...
46	47	...	48	49	50	51	96	97	98	99	...	.	..

Months in

	1	**2**	**3**	**4**	**5**	**6**	**7** or **0**
Ordinary years.	Aug.	Feb. Mar. Nov.	June	Sep. Dec.	Apr. July	Jan. Oct.	May
Leap years ...	Feb.	...	...	...	Jan.	...	...

[*Example.—To find week-day of 26th Jan. 1844—*
Add 4 + 6 + 5 + 26 and divide the total 41 by 7. Remainder, 6 = Friday.]

Centuries.

Kaliyuga		Commencement of solar year month and date.	Fraction of day.	First new moon in solar year.	☾'s anomaly at commencement of solar year.
	Brahma Siddhānta.				
	B.C.	**k**		**l**	**m**
0	3102	Feb. 15	·82708	2·17292	1·9988
1	3101	Feb. 16	·08552	20·81204	9·0481
	A.D.				
3501	400	Mar. 16	·61677	24·70841	20·4106
3601	500	Mar. 17	·46052	28·19466	8·9262
3701	600	Mar. 18	·30427	2·15032	24·9968
3801	700	Mar. 19	·14802	5·63657	13·5118
3901	800	Mar. 19	·99177	9·12282	2·0274
4001	900	Mar. 20	·83552	12·60907	18·0975
4101	1000	Mar. 21	·67927	16·09532	6·6130
4201	1100	Mar. 22	·52302	19·58156	22·6831
4301	1200	Mar. 23	·36677	23·06781	11·1987
4401	1300	Mar. 24	·21052	26·55406	27·2688
4501	1400	Mar. 25	·05427	0·50973	15·7843
4601	1500	Mar. 25	·89802	3·99598	4·2999
4701	1600	Mar. 26	·74177	7·48223	20·3700
4801	1700	Mar. 27	·58552	10·96848	8·8855
4901	1800	Apr. 9	·42927	14·45473	24·9552
5001	1900	Apr. 11	·27802	17·94098	13·4712
	Siddhānta Śiromaṇi.				
	B.C.	**k**		**l**	**m**
0	3102	Feb. 15	·82803	2·17197	1·9979
1	3101	Feb. 16	·00095	20·81110	9·0471
	A.D.				
3501	400	Mar. 16	·61120	24·76179	20·3880
4001	900	Mar. 20	·82908	12·67021	18·0144
4101	1000	Mar. 21	·67265	16·15800	6·5278
4201	1100	Mar. 22	·51621	19·64580	22·6998
4301	1200	Mar. 23	·35978	23·13360	11·1156
4401	1300	Mar. 24	·20335	26·62139	27·1773
4501	1400	Mar. 25	·04691	0·57862	15·6907
4601	1500	Mar. 25	·89048	4·06641	4·2042
4701	1600	Mar. 26	·78404	7·55422	20·2721
4801	1700	Mar. 27	·57761	11·04203	8·7856
4901	1800	Apr. 9	·42117	14·52982	24·8538
5001	1900	Apr. 11	·26474	18·01762	13·3671

AND SIDDHĀNTA ŚIROMAṆI.

the way in which they are to be used is shown in the specimen problems attached.

The Table is the same for Brahma Siddhānta and Siddhānta Śiromaṇi, except under a, k, l, m, o, p.

5 ..120°	6 ..150°	7...180°	8...210°	9 ..240°	10...270°	11 ..300°	12 . 330°	
Bhādrapada	Āśvina	Kārttika	Mārgaśirsha	Pausha	Māgha	Phālguna	Chaitra	
Siṁha	Kanyā	Tulā	Vriśchika	Dhanus	Makara	Kumbha	Mīna	——
Avaṇi	Puraṭṭāśi	Aippasi	Kārttigai	Mārgaḷi	Tai	Māsi	Panguni	
125·4471	156·4872	186·9415	216 8368	246·2983	275·6719	305·1177	334·9283	365·2584
125·4213	156·4805	186·9562	216·8699	246·3774	275·7160	305·1533	334·9385	365·2584
Aug 15	Sep. 15	Oct 15	Nov. 14	Dec. 14	Jan. 12	Feb. 10	March 12	
(5) *Bhādrapada*	(6) *Āśvina*	(7) *Kārttika*	(8) *Mārgaśirsha*	(9) *Pausha*	(10) *Māgha*	(11) *Phālguna*	(12) *Chaitra*	(13) *Chaitra when there is an adhika month.*
118·1223	147·6530	177·1836	206·7141	236·2447	265·7753	295·3059	324·8365	354·3670
7·904	9·880	11·856	13 832	15·808	17·784	19·760	21·736	23·712

decimals of a day, and moon's anomalistic months.

6	7	8	9	10	11	12	13	14	15
5·9061	6·8905	7·8748	8·8592	9·8435	10·8379	11·8122	12·7966	13·7809	14·7653
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
20·6714	21·6558	22·6401	23·6245	24·6988	25·5932	26·5775	27·5619	28·5462	29·5306

Moon's anomalistic months.

1 month = 27·5545 days.
2 months = 55·1090 days.
12 months = 330·6540.
13 months = 358·2085.

decimals of a day. (* The signs – and + are to be applied to the equation in heavy type and not to the anomaly.)

	·21	·22	·23	·24	·25	·26	·27	·28	·29	·30	·31	·32	·33	·34	·35	·36	·37	·38	·39	·40	·41
e For tithis.	2·55	2·68	2·82	2·96	3·10	3·25	3·40	3·55	3·71	3·87	4·04	4·22	4·41	4·60	4·79	5·00	5·25	5·52	5·84	6·23	6·79
	11·65	11·53	11·41	11·29	11·17	11·05	10·92	10·79	10·65	10·51	10·36	10·20	10·08	9·86	9·68	9·49	9·28	9·02	8·74	8·39	7·83
	15·90	16·02	16·14	16·26	16·38	16·51	16·64	16·77	16·90	17·05	17·20	17·36	17·52	17·69	17·87	18·06	18·27	18·54	18·81	19·17	19·72
	25·01	24·87	24·73	24·59	24·45	24·30	24·15	24·00	23·85	23·68	23·51	23·33	23·15	22·96	22·76	22·55	22·32	22·03	21·74	21·36	20·79
f For nakshatras.	2·76	2·91	3·06	3·22	3·38	3·54	3·71	3·89	4·07	4·27	4·48	4·69	4·90	5·15	5·46	5·79	6·16	6·82			
	11·43	11·30	11·17	11·04	10·90	10·76	10·61	10·45	10·28	10·11	9·92	9·73	9·53	9·31	9·01	8·71	8·36	7·72			
	16·12	16·25	16·38	16·52	16·66	16·80	16·95	17·11	17·27	17·45	17·63	17·82	18·02	18·24	18·54	18·85	19·19	19·84			
	24·79	24·64	24·49	24·33	24·17	24·01	23·84	23·67	23·48	23·29	23·08	22·87	22·65	22·41	22·09	21·76	21·39	20·73			
g For yogas.	2·98	3·14	3·31	3·49	3·67	3·86	4·05	4·26	4·49	4·72	4·97	5·24	5·58	5·95	6·49						
	11·21	11·07	10·92	10·77	10·61	10·44	10·26	10·07	9·87	9·65	9·42	9·18	8·86	8·50	7·99						
	16·34	16·48	16·63	16·79	16 95	17·11	17·29	17·48	17·68	17·90	18·13	18·38	18·69	19·05	19·57						
	24·57	24·41	24·24	24·06	23·88	23·70	23·50	23·29	23·07	22·83	22·58	22·31	21·98	21·60	21·06						

year and decimals of a day. (The anomalies are entered in ordinary type and the equations, with appropriate signs, in heavy type.)

– 01	– ·02	– ·03	– ·04	– ·05	– ·06	– ·07	– ·08	– ·09	– 10	– ·11	– ·12	– 13	– ·14	– ·15	– ·16	– ·17	– ·175	– ·178
85	88	91	94	98	101	105	108	112	116	120	124	129	134	139	146	155	161	169
261	257	254	251	247	244	240	237	233	229	225	221	216	211	206	199	191	184	176

– ·02	– ·01	– ·00	+ 01	+ 02	+ ·03	+ ·04	+ ·05	+ ·06	+ 07	+ ·08	+ ·09	+ ·10	+ ·11	+ 12	+ ·13	+ ·14	+ ·15	+ ·153	+ ·154
74	77	81·23	85	89	93	96	100	104	109	113	118	122	128	133	140	148	160	167	172·4
271	268	263·86	260	256	252	248	244	240	236	232	227	222	217	212	205	197	185	178	172·4

Odd years.

	Fraction of day, marking commencement of solar year	First new moon in solar year	☾'s anomaly at beginning of solar year		Fraction of day, marking commencement of solar year.	First new moon in solar year.	☾'s anomaly at beginning of solar year.		Fraction of day, marking commencement of solar year.	First new moon in solar year	☾'s anomaly at beginning of solar year
	n	o	p		n	o	p		n	o	p
1	·25844	18·63913	7·0493	**35**	1 04531	2·69672	26·2904	**69**	·83219	16 28488	7·9770
2	·51687	7·74768	14 0987	**36**	30375	21·33584	5 7852	**70**	1·09063	5·39343	25·0263
3	·77631	26·38681	21 1480	**37**	·56219	10·44440	12·8346	**71**	1·34906	24·08256	4·5211
4	·03375	15·49535	0·6428	**38**	·82063	29 08352	19 8839	**72**	·60750	13·14111	11·5705
5	29219	4·60390	7 6921	**39**	1·07906	18·19201	26 9332	**73**	·86594	2·24965	8·6198
6	·55062	23·24303	14 7415	**40**	·33750	7·30061	6 4280	**74**	1·12438	20·88878	25·6691
7	·80906	12·35158	21 7908	**41**	·59594	25·93974	13·4773	**75**	1·38281	9·99738	5·1689
8	·06750	1·46012	1 2856	**42**	·85438	15·04829	20·5267	**76**	·64125	28·68646	·12·2188
9	32594	20 09925	8 3349	**43**	1·11281	4·15684	27·5760	**77**	·89969	17·74501	19·2626
10	·58438	9·20780	15·3843	**44**	·37125	22 79596	7·0708	**78**	1·15813	6·85355	26·3119
11	·84281	27·84698	22·4336	**45**	·62969	11·90451	14 1202	**79**	1·41656	25·49268	5·8067
12	·10125	16·95548	1·9284	**46**	·88813	1·01806	21·1695	**80**	·67500	14·60123	12·8561
13	35969	6 06402	8·9778	**47**	1·14656	19·65219	28·2189	**81**	·93344	3·70978	19·9054
14	·61813	24·70815	16·0271	**48**	·40500	8·76074	7·7136	**82**	·19188	22·34890	26·9548
15	·87656	13·81170	23 0764	**49**	·66344	27·39987	14·7630	**83**	·45031	11·45745	6·4495
16	·13500	2·92025	2·5712	**50**	·92188	16·50841	21·8123	**84**	·70875	0·56601	13·4989
17	·39344	21 55937	9·6206	**51**	1·18031	5 61696	1·3071	**85**	·96719	19·20518	20·5482
18	·65188	16 66792	16·6690	**52**	·43875	24·25608	8·3565	**86**	1·22563	8·31368	·0430
19	·94031	29·30705	23·7192	**53**	·69719	13·36464	15·4008	**87**	1·48406	26·95281	7·0923
20	·16875	18·41560	8 2140	**54**	·95563	2·47318	22·4551	**88**	·74250	16·06185	14·1417
21	·42719	7 52415	10 2684	**55**	1·21406	21·11231	1·9499	**89**	1·00094	5·16990	21·1910
22	·68503	26·16327	17·3127	**56**	·47250	10·22086	8·8993	**90**	1·25937	23·80903	·6858
23	·94406	15·27182	24·3620	**57**	·73094	28·85999	16·0486	**91**	1·51781	12·91758	7·7351
24	·20250	4·39037	3·8568	**58**	·98938	17·96854	23·0979	**92**	·77625	2·02613	14·7845
25	·46094	23·01950	19·9062	**59**	1·24781	7·07708	2·5927	**93**	1·03469	20·66525	21·8338
26	·71938	12·12804	17·9555	**60**	·50625	25·71621	9·6421	**94**	1·29313	9·77380	1·3286
27	·97781	0·12366	25·0048	**61**	·76469	14·82476	16·6914	**95**	1·55156	28·41293	8·3780
28	·23625	19·87572	4·4996	**62**	1·02318	8·93331	28·7407	**96**	·81000	17·52148	15·4273
29	·49469	8·98427	11·5490	**63**	1·28156	22·57244	8·2355	**97**	1·06844	6·63002	22·4766
30	·75313	27 62840	18·5983	**64**	·54000	11·68098	10·2850	**98**	1·32688	25·26915	1·9714
31	1·01156	16·73194	25·6476	**65**	·79844	0·78953	17·3342	**99**	1·58531	14·37770	9·0208
32	·27000	5·84049	5·1424	**66**	·05688	19·42866	24·3835	**100**	·25844	3·48625	16·0701
33	·52844	24·47962	12·1918	**67**	1·31531	8·53721	3·8783				
34	·78688	13·58817	19·2411	**68**	·57375	27·17634	10·9276				

For Siddhānta Śiromaṇi, **odd years**, **n** is the same as for Brahma Siddhānta. **o** is very slightly more, the increase being + ·000014 for every year, total increase of **o** for 100 yrs. = ·00137. Similarly **p** for Siddhānta Śiromaṇi odd years decreases by ·00002 for every year; total decrease of **p** for 100 yrs. = ·002.

q Days counted from March 1

	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sep. 1	Oct. 1	Nov. 1	Dec. 1	Jan. 1	Feb. 1	Mar. 1
March ...	1	32	62	93	123	154	185	215	246	276	307	338	...

r														
Ghatikas ..	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Fraction of day.	·0167	·0333	·0500	·0667	·0833	·1000	·1167	·1333	·1500	·1667	·1833	·2000	·2167	·2333
Ghatikas ...	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**
Fraction of day.	·5167	·5333	·5500	·5667	·5833	·6000	·6167	·6333	·6500	·6667	·6833	·7000	·7167	·7833
Palas	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**15**	**17**	**20**
Fraction of day.	·0003	·0005	·0008	·0011	·0014	·0017	·0019	·0022	·0025	·0028	·0033	·0042	·0047	·0055

NAKSHA

s Shortest interval in days, from new moon to ending

Longitude at commencement. Deg.	Min.	Sec.	Order	Names of nakshatras.	Days.	Order	Ordinarily Vaisākha I	Order	Ordinarily Jyeshṭha II	Order	Ordinarily Āshāḍha III	Order	Ordinarily Śrāvana IV	Order	Ordinarily Bhādrapada V	Order	Ordinarily Āśvina VI	Order	Ordinarily Kārttika VII
			27	Revati		**3**	0·4586	**5**	0·7446	**7**	0·5357	**10**	0·8267	**12**	1·277	**14**	0·4089	**16**	0·7000
0	0	0	**1**	Aśvini	1	**4**	1·9536	**6**	1·2446	**8**	1·5357	**11**	1·8267	**13**	2·277	**15**	1·4089	**17**	1·7000
13	10	35	**2**	Bharaṇi	1·5	**5**	2·9536	**7**	2·7446	**9**	2·0357	**12**	3·3267	**14**	2·617/	**16**	2·9089	**18**	2·2000
19	45	52	**3**	Krittikā	2·5	**6**	3·4536	**8**	3·7446	**10**	3·0357	**13**	4·3267	**15**	3·6177	**17**	3·9089	**19**	3·2000
32	56	27	**4**	Rohini	4	**7**	4·9536	**9**	4·2446	**11**	4·0357	**14**	4·8267	**16**	5·1177	**18**	4·4089	**20**	4·2000
52	42	20	**5**	Mrigaśira	5	**8**	5·9536	**10**	5·2446	**12**	5·5857	**15**	5·8267	**17**	6·1177	**19**	5·4089	**21**	5·7000
65	52	55	**6**	Ardrā	5·5	**9**	6·4536	**11**	6·2446	**13**	6·5357	**16**	7·8267	**18**	6·6177	**20**	6·4089	**A**	6·0216
72	28	12	**7**	Punarvasu . ..	7	**10**	7·4536	**12**	7·7446	**14**	7·0357	**17**	8·3267	**19**	7·6177	**21**	7·9089	**22**	7·0216
92	14	5	**8**	Pushya	8	**11**	8·4586	**13**	8·7446	**15**	8·0357	**18**	8·8267	**20**	8·6177	**A**	8·2305	**23**	8·0216
105	24	40	**9**	Asleshā	8·5	**12**	9·9536	**14**	9·2446	**16**	9·5357	**19**	9·8267	**21**	10·1177	**22**	9·2805	**24**	8·5216
111	59	57	**10**	Maghā	9·5	**13**	10·9586	**15**	10·2447	**17**	10·5357	**20**	10·8267	**A**	10·4393	**23**	10·2805	**25**	9·0216
125	10	32	**11**	Pūrva-Phalguni ...	10 5	**14**	11·4536	**16**	11·7447	**18**	11·0357	**21**	12·3267	**22**	11·4393	**24**	10·7305	**26**	11·0216
138	21	7	**12**	Uttara-Phalguni ...	12	**15**	12·4536	**17**	12·7447	**19**	12·0357	**A**	12·6483	**23**	12·4394	**25**	11·7805	**27**	12·0216
158	7	0	**13**	Hasta	13	**16**	13·9536	**18**	13·2447	**20**	13·0357	**22**	13·6483	**24**	12·9394	**26**	13·2305	**1**	13·0216
171	17	35	**14**	Chitrā	13·5	**17**	14·9536	**19**	14·2447	**21**	14·5357	**23**	14·6483	**25**	13·9394	**27**	14·2305	**2**	13·5216
178	28	10	**15**	Svāti	14·5	**18**	15·4536	**20**	15·2447	**A**	14·8573	**24**	15·1483	**26**	15·4394	**1**	15·2305	**3**	14·5216
191	3	27	**16**	Visākhā	16	**19**	16·4536	**21**	16·7447	**22**	15·8573	**25**	16·1483	**27**	16·4394	**2**	15·7305	**4**	16·0216
210	49	20	**17**	Anurādhā	17	**20**	17·4536	**A**	17·0663	**23**	16·8573	**26**	17·6483	**1**	17·4394	**3**	16·7305	**5**	17·0216
223	59	55	**18**	Jyeshṭhā	17·5	**21**	18·9536	**22**	18·0663	**24**	17·3573	**27**	18·6483	**2**	17·9394	**4**	18·2305	**6**	17·5216
230	35	12	**19**	Mūla	18·5	**A**	19·2752	**23**	19·0663	**25**	18·8573	**1**	19·6183	**3**	18·9394	**5**	19·2305	**7**	19·0216
248	45	47	**20**	Purva-Āshāḍhā ...	19·5	**22**	20·2752	**24**	19·5663	**26**	19·8573	**2**	20·1483	**4**	20·4394	**6**	19·7305	**8**	20·0216
256	56	22	**21**	Uttara Āshāḍhā ...	21	**23**	21·2752	**25**	20·5663	**27**	20·8573	**3**	21·1483	**5**	21·4394	**7**	21·2805	**9**	20·5216
276	42	15	**A**	Abhijit . ..	21·3216	**24**	21·7752	**26**	22·0663	**1**	21·8573	**4**	22·6483	**6**	21·9394	**8**	22·2305	**10**	21·5216
280	56	30	**22**	Śravaṇa	22·82	**25**	22·7752	**27**	23·0663	**2**	22·3573	**5**	23·6483	**7**	23·4394	**9**	22·7805	**11**	22·5216
294	7	5	**23**	Dhanishta	23·32	**26**	24·2752	**1**	24·0663	**3**	23·3573	**6**	24·1483	**8**	24·4394	**10**	23·7805	**12**	24·0216
307	17	40	**24**	Satabhishaj	24·82	**27**	25·2752	**2**	24·5663	**4**	24·8578	**7**	25·6483	**9**	24·9394	**11**	24·7305	**13**	25·0216
313	52	57	**25**	Pūrva-Bhādrapadā ...	25 32	**1**	26·2752	**3**	25·5663	**5**	25·8573	**8**	26·6483	**10**	25·9394	**12**	26·2305	**14**	25·5216
327	3	32	**26**	Uttara-Bhādrapadā ...	26 32	**2**	26·7752	**4**	27·0668	**6**	26·3573	**9**	27·1483	**11**	26·9894	**13**	27·2805	**15**	26·5216
346	49	25	**27**	Revati	27·32	**3**	27·7752	**5**	28·0663	**7**	27·8573	**10**	28·1483	**12**	28·4394	**14**	27·7305	**16**	28·0216
						4	29·2752	**6**	28·5663	**8**	28·8573	**11**	29·2483	**13**	29·4394	**15**	28·7805	**17**	29·0216
										9	29·3573							**18**	29·5216

YOGAS.

v Shortest interval in days from new moon to

Longitude at commencement. Deg.	Min.	Order	Names of yogas.	Order	Ordinarily Vaisākha	Order	Ordinarily Jyeshṭha	Order	Ordinarily Āshāḍha	Order	Ordinarily Śrāvaṇa	Order	Ordinarily Bhādrapada	Order	Ordinarily Āśvina	Order	Ordinarily Kārttika
346	40	**27**	Vaidhriti	**5**	0·8995	**9**	0·5551	**13**	0·2107	**18**	0·8078	**22**	0·4634	**26**	0·1190	**4**	0·7160
0	0	**1**	Vishkamba	**6**	1·8410	**10**	1·4966	**14**	1·1522	**19**	1·7493	**23**	1·4049	**27**	1·0604	**5**	1·6575
13	20	**2**	Priti	**7**	2·7825	**11**	2·4381	**15**	2·0937	**20**	2·6908	**24**	2·3463	**1**	2·0019	**6**	2·5990
26	40	**3**	Ayushmat	**8**	3·7240	**12**	3·3796	**16**	3·0352	**21**	3·6312	**25**	3·2878	**2**	2·9434	**7**	3·5405
40	0	**4**	Saubhagya	**9**	4·6655	**13**	4·3211	**17**	3·9766	**22**	4·5737	**26**	4·2293	**3**	3·8849	**8**	4·4820
53	20	**5**	Sobhana	**10**	5·6070	**14**	5·2625	**18**	4·9181	**23**	5·5152	**27**	5·1708	**4**	4·8264	**9**	5·4235
66	40	**6**	Atiganda	**11**	6·5485	**15**	6·2040	**19**	5·8596	**24**	6·4567	**1**	6·1123	**5**	5·7679	**10**	6·3650
80	0	**7**	Sukarman	**12**	7·4889	**16**	7·1455	**20**	6·8011	**25**	7·3982	**2**	7·0538	**6**	6·7094	**11**	7·3065
93	20	**8**	Dhriti	**13**	8·4314	**17**	8·0870	**21**	7·7426	**26**	8·3397	**3**	7·9953	**7**	7·6509	**12**	8·2480
106	40	**9**	Sula	**14**	9·3729	**18**	9·0285	**22**	8·6841	**27**	9·2812	**4**	8·9368	**8**	8·5924	**13**	9·1894
120	0	**10**	Ganda	**15**	10·3144	**19**	9·9700	**23**	9·6256	**1**	10·2227	**5**	9·8783	**9**	9·5338	**14**	10·1309
133	20	**11**	Vriddhi	**16**	11·2559	**20**	10·9115	**24**	10·5671	**2**	11·1642	**6**	10·8198	**10**	10·4753	**15**	11·0724
146	40	**12**	Dhruva	**17**	12·1974	**21**	11·8530	**25**	11·5086	**3**	12·1056	**7**	11·7612	**11**	11·4168	**16**	12·0139
160	0	**13**	Vyaghata	**18**	13·1389	**22**	12·7945	**26**	12·4501	**4**	13·0471	**8**	12·7027	**12**	12·3583	**17**	12·9554
173	20	**14**	Harshana	**19**	14·0804	**23**	13·7360	**27**	13·3915	**5**	13·9886	**9**	13·6442	**13**	13·2998	**18**	13·8969
186	40	**15**	Vajra	**20**	15·0219	**24**	14·6774	**1**	14·3330	**6**	14·9301	**10**	14·5857	**14**	14·2413	**19**	14·8384
200	0	**16**	Siddhi	**21**	15·9633	**25**	15·6189	**2**	15·2745	**7**	15·8716	**11**	15·5272	**15**	15·1828	**20**	15·7799
218	20	**17**	Vyatipata	**22**	16·9048	**26**	16·5604	**3**	16·2160	**8**	16·8131	**12**	16·4687	**16**	16·1248	**21**	16·7214
226	40	**18**	Variyas	**23**	17·8463	**27**	17·5019	**4**	17·1575	**9**	17·7546	**13**	17·4102	**17**	17·0658	**22**	17·6628
240	0	**19**	Parigha	**24**	18·7878	**1**	18·4434	**5**	18·0990	**10**	18·6961	**14**	18·3517	**18**	18·0073	**23**	18·6043
253	20	**20**	Siva	**25**	19·7293	**2**	19·3849	**6**	19·0405	**11**	19·6376	**15**	19·2932	**19**	18·9487	**24**	19·5458
266	40	**21**	Siddha	**26**	20·6708	**3**	20·3264	**7**	19·9820	**12**	20·5791	**16**	20·2346	**20**	19·3902	**25**	20·4873
280	0	**22**	Sadhya	**27**	21·6123	**4**	21·2679	**8**	20·9235	**13**	21·5205	**17**	21·1761	**21**	20·8317	**26**	21·4288
293	20	**23**	Subha	**1**	22·5538	**5**	22·2094	**9**	21·8650	**14**	22·4620	**18**	22·1176	**22**	21·7732	**27**	22·3703
306	40	**24**	Śukla	**2**	23·4953	**6**	23·1509	**10**	22·8064	**15**	23·4035	**19**	23·0591	**23**	22·7147	**1**	23·3118
320	0	**25**	Brahman	**3**	24·4368	**7**	24·0923	**11**	23·7479	**16**	24·3450	**20**	24·0006	**24**	23·6562	**2**	24·2533
333	20	**26**	Indra	**4**	25·3782	**8**	25·0538	**12**	24·6894	**17**	25·2865	**21**	24·9421	**25**	24·5977	**3**	25·1948
346	40	**27**	Vaidhriti	**5**	26·3197	**9**	25·9758	**13**	25·6309	**18**	26·2280	**22**	25·8836	**26**	25·5392	**4**	26·1365
				6	27·2619	**10**	26·9168	**14**	26·5724	**19**	27·1695	**23**	26·8251	**27**	26·4805	**5**	27·0777
				7	28·2027	**11**	27·8583	**15**	27·5189	**20**	28·1110	**24**	27·7666	**1**	27·4222	**6**	28·0192
				8	29·1442	**12**	28·7998	**16**	28·4554	**21**	29·0525	**25**	28·7081	**2**	28·3636	**7**	28·9607
								17	29·3969					**3**	29·3051		

q Days counted from April 1

	Apr. 1	May 1	June 1	July 1	Aug. 1	Sep. 1	Oct. 1	Nov. 1	Dec. 1	Jan. 1	Feb. 1	Mar. 1
April ...	1	31	62	92	123	154	184	215	245	276	307	335

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15	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
·2500	·2667	·2833	·3000	·3167	·3333	·3500	·3667	·3833	·4000	·4167	·4333	·4500	·4667	·4833	·5000
45	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
·7500	·7667	·7833	·8000	·8167	·8333	·8500	·8667	·8833	·9000	·9167	·9333	·9500	·9667	·9833	1·0000
22	**25**	**27**	**30**	**32**	**35**	**37**	**40**	**42**	**45**	**47**	**50**	**52**	**55**	**57**	**60**
·0061	·0069	·0075	·0083	·0089	·0097	·0103	·0111	·0117	·0125	·0130	·0139	·0144	·0153	·0158	·0167

TRAS.

moment of each nakshatra.

Order	Ordinarily Mārgasīrsha VIII	Order	Ordinarily Pausha IX	Order	Ordinarily Māgha X	Order	Ordinarily Phālguna XI	Order	Chaitra when no Adhika Masa XII	Order	Chaitra when there is Adhika Masa XIII
19	0·9910	**21**	1·2821	**22**	0·3948	**25**	0·6869	**27**	0·9770	**2**	0·2681
20	1·9910	**A**	1·6037	**23**	1·3948	**26**	2·1859	**1**	1·9770	**3**	1·2681
21	3·4910	**22**	2·6037	**24**	1·8948	**27**	3·1859	**2**	2·4770	**4**	2·7681
A	3·8126	**23**	3·6037	**25**	2·8248	**1**	4·1859	**3**	3·4770	**5**	3·7681
22	4·8126	**24**	4·1037	**26**	4·3948	**2**	4·6859	**4**	4·9770	**6**	4·2681
23	5·8126	**25**	5·1037	**27**	5·3948	**3**	5·6859	**5**	5·9770	**7**	5·7681
24	6·3126	**26**	6·6037	**1**	6·3948	**4**	7·1859	**6**	6·4770	**8**	6·7681
25	7·3126	**27**	7·6037	**2**	6·8948	**5**	8·1859	**7**	7·9770	**9**	7·2681
26	8·8126	**1**	8·6037	**3**	7·8948	**6**	8·6859	**8**	8·9770	**10**	8·2681
27	9·8126	**2**	9·1037	**4**	9·3948	**7**	10·1859	**9**	9·4770	**11**	9·2681
1	10·8126	**3**	10·1037	**5**	10·3948	**8**	11·1859	**10**	10·4770	**12**	10·7621
2	11·3126	**4**	11·6037	**6**	10·8948	**9**	11·6859	**11**	11·4770	**13**	11·7681
3	12·3126	**5**	12·6037	**7**	12·3948	**10**	12·6859	**12**	12·9770	**14**	12·2681
4	13·8126	**6**	13·1037	**8**	13·3948	**11**	13·6859	**13**	13·9770	**15**	13·2681
5	14·8126	**7**	14·6037	**9**	14·8948	**12**	15·1859	**14**	14·4770	**16**	14·7681
6	15·3126	**8**	15·6037	**10**	14·8948	**13**	16·1859	**15**	15·4770	**17**	15·7681
7	16·8126	**9**	16·1037	**11**	15·8948	**14**	16·6859	**16**	16·9770	**18**	16·2681
8	17·8126	**10**	17·1037	**12**	17·3948	**15**	17·6859	**17**	17·9770	**19**	17·2681
9	18·3126	**11**	18·1037	**13**	18·3948	**16**	19·1859	**18**	18·4770	**20**	18·2681
10	19·3126	**12**	19·6037	**14**	18·8948	**17**	20·1859	**19**	19·4770	**21**	19·7681
11	20·3126	**13**	20·6037	**15**	19·8948	**18**	20·6859	**20**	20·4770	**A**	20·0897
12	21·8126	**14**	21·1037	**16**	21·3948	**19**	21·6859	**21**	21·9770	**22**	21·0897
13	22·8126	**15**	22·1037	**17**	22·3948	**20**	22·6859	**A**	22·2986	**23**	22·0897
14	23·3126	**16**	23·6037	**18**	22·8948	**21**	24·1859	**22**	23·2986	**24**	22·5897
15	24·8126	**17**	24·6037	**19**	23·8948	**A**	24·5075	**23**	24·2986	**25**	23·5897
16	25·8126	**18**	25·1037	**20**	24·8948	**22**	25·5075	**24**	24·7986	**26**	25·0897
17	26·8126	**19**	26·1037	**21**	26·3948	**23**	26·5075	**25**	25·7986	**27**	26·0897
18	27·3126	**20**	27·1037	**A**	26·7164	**24**	27·0075	**26**	27·2986	**1**	27·0897
19	28·3126	**21**	28·6037	**22**	27·7164	**25**	28·0075	**27**	28·2986	**2**	27·5897
20	28·3126	**A**	28·9253	**23**	28·7164	**26**	29·5075	**1**	29·2986	**3**	28·5897
				24	29·2164						

Annual correction.

Argument.—Date of appearance of 1st new moon in each solar year

The correction **u** or **x** corresponding to the decimal portion of the argument should be *subtracted* from the nakshatra or yoga correction corresponding to the integral portion **t** or **u**.

Ex the nakshatra correction corresponding to an argument 28 53 = 0·11 *minus* ·04 = 0·07. The yoga correction for the same argument is 0·21 *minus* ·07 = 0·14.

The whole correction thus obtained should be *added* to ending moment of nakshatra or yoga in Eye-table **(s)** or **(v)**.

NAKSHATRAS.

Arg.	Corrn. t	Arg.	Corrn. t	Arg.	Corrn. t	Arg.	Corrn. t	Arg.	Corrn. t
0	2·20890	**6**	1·76010	**12**	1·31129	**18**	0·86249	**24**	0·41368
1	2·13110	**7**	1·68531	**13**	1·23649	**19**	0·78762	**25**	0·33888
2	2·05930	**8**	1·61049	**14**	1·16169	**20**	0·71288	**26**	0·26408
3	1·98450	**9**	1·53569	**15**	1·08689	**21**	0·63808	**27**	0·18928
4	1·90970	**10**	1·46089	**16**	1·01209	**22**	0·56328	**28**	0·11448
5	1·83490	**11**	1·38609	**17**	0·93729	**23**	0·48818	**29**	0·03968

Arg.	u	Arg.	u	Arg.	u	Arg.	u	Arg.	u
·01	·00075	**·21**	·01571	**·41**	·03067	**·61**	·04565	**·81**	·06059
·02	·00150	**·22**	·01646	**·42**	·03142	**·62**	·04638	**·82**	·06134
·03	·00224	**·23**	·01720	**·43**	·03216	**·63**	·04712	**·83**	·06208
·04	·00299	**·24**	·01795	**·44**	·03291	**·64**	·04787	**·84**	·06283
·05	·00374	**·25**	·01870	**·45**	·03366	**·65**	·04862	**·85**	·06358
·06	·00449	**·26**	·01945	**·46**	·03441	**·66**	·04937	**·86**	·06433
·07	·00524	**·27**	·02020	**·47**	·03516	**·67**	·05012	**·87**	·06508
·08	·00598	**·28**	·02094	**·48**	·03590	**·68**	·05086	**·88**	·06582
·09	·00673	**·29**	·02169	**·49**	·03665	**·69**	·05161	**·89**	06657
·10	·00748	**·30**	·02244	**·50**	·03740	**·70**	·05236	**·90**	·06732
·11	·00823	**·31**	·02319	**·51**	·03815	**·71**	·05311	**·91**	·06807
·12	·00898	**·32**	·02394	**·52**	·03890	**·72**	·05386	**·92**	·06882
·13	·00972	**·33**	·02468	**·53**	·03964	**·73**	·05460	**·93**	·06956
·14	·01047	**·34**	·02543	**·54**	·04039	**·74**	·05535	**·94**	·07031
·15	·01122	**·35**	·02618	**·55**	·04114	**·75**	·05610	**·95**	·07106
·16	·01197	**·36**	·02693	**·56**	·04189	**·76**	·05685	**·96**	·07181
·17	·01272	**·37**	·02768	**·57**	·04264	**·77**	·05760	**·97**	·07256
·18	·01346	**·38**	·02842	**·58**	·04338	**·78**	·05834	**·98**	·07330
·19	·01421	**·39**	·02917	**·59**	·04413	**·79**	·05909	**·99**	·07405
·20	·01496	**·40**	·02992	**·60**	·04488	**·80**	·05984		

ending moment of each yoga.

Order	Ordinarily Mārgasīrsha	Order	Ordinarily Pausha	Order	Ordinarily Māgha	Order	Ordinarily Phālguna	Order	Chaitra when no Adhika Masa	Order	Chaitra when there is Adhika Masa
8	0·3716	**12**	0·0272	**17**	0·6243	**21**	0·2799	**26**	0·8770	**3**	0·5325
9	1·3181	**13**	0·9687	**18**	1·5658	**22**	1·2214	**27**	1·8185	**4**	1·4740
10	2·2546	**14**	1·9102	**19**	2·5073	**23**	2·1629	**1**	2·7599	**5**	2·4155
11	3·1961	**15**	2·8517	**20**	3·4488	**24**	3·1044	**2**	3·7014	**6**	3·3570
12	4·1376	**16**	3·7930	**21**	4·3903	**25**	4·0458	**3**	4·6429	**7**	4·2985
13	5·0791	**17**	4·7347	**22**	5·3317	**26**	4·9873	**4**	5·5844	**8**	5·2400
14	6·0206	**18**	5·6762	**23**	6·2732	**27**	5·9288	**5**	6·5256	**9**	6·1815
15	6·9621	**19**	6·6176	**24**	7·2147	**1**	6·8703	**6**	7·4674	**10**	7·1230
16	7·9035	**20**	7·5591	**25**	8·1562	**2**	7·8118	**7**	8·4089	**11**	8·0645
17	8·8450	**21**	8·5006	**26**	9·0977	**3**	8·7533	**8**	9·3504	**12**	9·0060
18	9·7865	**22**	9·4121	**27**	10·0392	**4**	9·6948	**9**	10·2919	**13**	9·9475
19	10·7280	**23**	10·3836	**1**	10·9807	**5**	10·6363	**10**	11·2334	**14**	10·8889
20	11·6695	**24**	11·3251	**2**	11·9222	**6**	11·5778	**11**	12·1748	**15**	11·8304
21	12·6110	**25**	12·2666	**3**	12·8637	**7**	12·5193	**12**	13·1163	**16**	12·7719
22	13·5525	**26**	13·2081	**4**	13·8051	**8**	13·4607	**13**	14·0578	**17**	13·7134
23	14·4940	**27**	14·1496	**5**	14·7466	**9**	14·4022	**14**	14·9993	**18**	14·6549
24	15·4355	**1**	15·0910	**6**	15·6881	**10**	15·3437	**15**	15·9408	**19**	15·5964
25	16·3769	**2**	16·0325	**7**	16·6296	**11**	16·2852	**16**	16·8823	**20**	16·5379
26	17·3184	**3**	16·9740	**8**	17·5711	**12**	17·2267	**17**	17·8238	**21**	17·4794
27	18·2599	**4**	17·9155	**9**	18·5126	**13**	18·1682	**18**	18·7653	**22**	18·4209
1	19·2014	**5**	18·8570	**10**	19·4541	**14**	19·1097	**19**	19·7068	**23**	19·3624
2	20·1429	**6**	19·7985	**11**	20·3956	**15**	20·0512	**20**	20·6487	**24**	20·3082
3	21·0844	**7**	20·7310	**12**	21·3371	**16**	20·9927	**21**	21·5897	**25**	21·2452
4	22·0259	**8**	21·6815	**13**	22·2786	**17**	21·9341	**22**	22·5310	**26**	22·1868
5	22·9674	**9**	22·6230	**14**	23·2200	**18**	22·8756	**23**	23·4727	**27**	23·1238
6	23·9088	**10**	23·5645	**15**	24·1615	**19**	23·8171	**24**	24·4137	**1**	24·0698
7	24·8504	**11**	24·5059	**16**	25·1030	**20**	24·7586	**25**	25·3557	**2**	25·0118
8	25·7918	**12**	25·4474	**17**	26·0445	**21**	25·7001	**26**	26·2972	**3**	25·9528
9	26·7333	**13**	26·3889	**18**	26·9860	**22**	26·6417	**27**	27·2387	**4**	26·8943
10	27·6748	**14**	27·3304	**19**	27·9275	**23**	27·5831	**1**	28·1802	**5**	27·8358
11	28·6163	**15**	28·2719	**20**	28·8690	**24**	28·5247	**2**	29·1217	**6**	28·7772
		16	29·2134			**25**	29·4861				

YOGAS.

See note on ANNUAL CORRECTION *supra*.

Arg.	w	Arg.	w	Arg.	w	Arg.	w	Arg.	w
0	4·11036	**6**	3·27522	**12**	2·44008	**18**	1·60494	**24**	0·76980
1	3·97117	**7**	3·13603	**13**	2·30089	**19**	1·46575	**25**	0·63061
2	3·83198	**8**	2·99684	**14**	2·16170	**20**	1·32656	**26**	0·49142
3	3·69279	**9**	2·85765	**15**	2·02251	**21**	1·18737	**27**	0·35223
4	3·55360	**10**	2·71846	**16**	1·88332	**22**	1·04818	**28**	0·21304
5	3·41411	**11**	2·57927	**17**	1·74413	**23**	0·90899	**29**	0·07385

Arg.	x	Arg.	x	Arg.	x	Arg.	x	Arg.	x
·01	·00139	**·21**	·02923	**·41**	·05707	**·61**	·08491	**·81**	·11274
·02	·00278	**·22**	·03063	**·42**	·05846	**·62**	·08630	**·82**	·11413
·03	·00417	**·23**	·03291	**·43**	·05985	**·63**	·08769	**·83**	·11553
·04	·00557	**·24**	·03340	**·44**	·06124	**·64**	·08908	**·84**	·11692
·05	·00696	**·25**	·03480	**·45**	·06268	**·65**	·09047	**·85**	·11831
·06	·00835	**·26**	·03619	**·46**	·06498	**·66**	·09186	**·86**	·11970
·07	·00974	**·27**	·03758	**·47**	·06542	**·67**	·09326	**·87**	·12109
·08	·01113	**·28**	·03897	**·48**	·06681	**·68**	·09465	**·88**	·12249
·09	·01253	**·29**	·04036	**·49**	·06820	**·69**	·09604	**·89**	·12388
·10	·01392	**·30**	·04176	**·50**	·06959	**·70**	·09743	**·90**	·12527
·11	·01530	**·31**	·04315	**·51**	·07098	**·71**	·09882	**·91**	·12663
·12	·01670	**·32**	·04454	**·52**	·07238	**·72**	·10022	**·92**	·12805
·13	·01809	**·33**	·04593	**·53**	·07377	**·73**	·10161	**·93**	·12945
·14	·01949	**·34**	·04732	**·54**	·07516	**·74**	·10300	**·94**	·13084
·15	·02088	**·35**	·04872	**·55**	·07655	**·75**	·10439	**·95**	·13223
·16	·02227	**·36**	·05011	**·56**	·07795	**·76**	·10578	**·96**	·13362
·17	·02366	**·37**	·05150	**·57**	·07934	**·77**	·10798	**·97**	·13601
·18	·02505	**·38**	·05289	**·58**	·08073	**·78**	·10851	**·98**	·13641
·19	·02645	**·39**	·05428	**·59**	·08212	**·79**	·10996	**·99**	·13780
·20	·02784	**·40**	·05568	**·60**	·08351	**·80**	·11135		

y Calendar to be used with Table II, as directed in specimen problems, for ascertaining the A.D. month and day corresponding to any solar date, lunar tithi, nakshatra, yoga or karana.

Day of solar year.	Ending moment of tithi.	Tithi No.	☾'s An. for each tithi.
Vaiśākha.			
0	·9843	1	0·984
1	·9687	2	1·969
2	·9530	3	2·953
3	·9374	4	3 937
4	9217	5	4·921
5	·9061	6	5·906
6	·8904	7	6 890
7	·8748	8	7 875
8	·8592	9	8 859
9	·8435	10	9 843
10	8279	11	10 827
11	8122	12	11·812
12	·7966	13	12 797
13	·7809	14	13 781
14	·7652	15	14 765
15	·7496	**1**	15 750
16	·7340	**2**	16 734
17	7183	**3**	17·718
18	7027	**4**	18 703
19	·6870	**5**	19·687
20	·6714	**6**	20 671
21	6557	**7**	21·656
22	6401	**8**	22 640
23	6244	**9**	23 624
24	·6088	**10**	24 609
25	·5932	**11**	25 593
26	·5775	**12**	26 577
27	·5619	**13**	0 007
28	·5462	**14**	0 992
29	·5306	**15**	1·976
Jyeshṭha.			
30	·5149	1	2·960
31	·4993	2	3 945
32	·4836	3	4 929
33	4680	4	5·918
34	·4523	5	6·898
35	4367	6	7 882
36	4210	7	8 866
37	4054	8	9·851
38	3898	9	10 835
39	3741	10	11·819
40	·3585	11	12 804
41	3428	12	13 788
42	·3272	13	14·778
43	·3115	14	15 757
44	·2959	15	16·741
45	·2802	**1**	17 726
46	·2646	**2**	18 710
47	·2489	**3**	19 694
48	2333	**4**	20 679
49	·2176	**5**	21 663
50	·2020	**6**	22 647
51	1863	**7**	23 632
52	1707	**8**	24 616
53	·1551	**9**	25 600
54	·1394	**10**	26 585
55	·1238	**11**	0·015
56	1081	**12**	0 999
57	·0925	**13**	1·988
58	·0768.	**14**	2·968
59	·0612	**15**	3·952
Āshāḍha.			
60	0455	1	4·936
61	·0299	2	5·921
62	0142	3	6·905
62	·9986	4	7·889
63	·9829	5	8·874
Āshāḍha—cont			
64	9673	6	9 858
65	9516	7	10 842
66	·9360	8	11 827
67	·9203	9	12·811
68	·9047	10	13·795
69	8891	11	14 780
70	8734	12	15 764
71	8578	13	16 749
72	·8421	14	17 733
73	8265	15	18 717
74	8108	**1**	19 702
75	·7952	**2**	20 686
76	7795	**3**	21 670
77	7639	**4**	22 655
78	·7482	**5**	23 639
79	·7326	**6**	24 623
80	·7169	**7**	25 608
81	·7013	**8**	26 592
82	·6856	**9**	0 022
83	6700	**10**	1·006
84	6543	**11**	1·991
85	6387	**12**	2 975
86	·6231	**13**	3 959
87	·6074	**14**	4 941
88	·5918	**15**	5 928
Śrāvaṇa.			
89	·5761	1	6 912
90	5605	2	7 897
91	5448	3	8 881
92	5292	4	9 865
93	5135	5	10·850
94	·4979	6	11 834
95	4822	7	12 818
96	·4666	8	13·803
97	·4509	9	14 787
98	4353	10	15 771
99	4196	11	16 756
100	4040	12	17·740
101	3883	13	18·725
102	3727	14	19 709
103	3571	15	20 693
104	3414	**1**	21·678
105	·3258	**2**	22 662
106	3101	**3**	23·646
107	·2945	**4**	24 631
108	·2788	**5**	25·615
109	·2632	**6**	26 599
110	2475	**7**	0 029
111	·2319	**8**	1 013
112	·2162	**9**	1 998
113	·2006	**10**	2·982
114	·1849	**11**	3·966
115	1693	**12**	4 951
116	·1536	**13**	5 935
117	·1380	**14**	6 920
118	1223	**15**	7·904
Bhādrapada.			
119	1067	1	8·888
120	·0911	2	9 873
121	·0754	3	10·857
122	·0598	4	11 841
123	·0441	5	12 826
124	·0285	6	13 810
125	·0128	7	14·794
125	·9972	8	15 779
126	·9815	9	16·763
127	·9659	10	17·747
Bhādrapada—cont.			
128	·9502	11	18 732
129	·9346	12	19·716
130	9189	13	20 700
131	·9033	14	21·685
132	8876	15	22·669
133	8720	**1**	23 654
134	8563	**2**	24·638
135	·8407	**3**	25 622
136	8251	**4**	26·607
137	8094	**5**	0 036
138	7938	**6**	1 021
139	·7781	**7**	2·005
140	·7625	**8**	2 989
141	·7468	**9**	3 974
142	7312	**10**	4 958
143	7155	**11**	5 942
144	6999	**12**	6·927
145	6842	**13**	7·911
146	6686	**14**	8 896
147	6529	**15**	9 880
Āśvina.			
148	·6373	1	10 864
149	·6216	2	11·849
150	·6060	3	12 833
151	5904	4	13 817
152	·5747	5	14 802
153	5591	6	15·786
154	5434	7	16 770
155	5278	8	17 755
156	·5121	9	18 739
157	·4965	10	19 723
158	·4808	11	20 708
159	·4652	12	21 692
160	·4495	13	22·676
161	4339	14	23 661
162	4182	15	24 645
163	·4026	**1**	25 630
164	3869	**2**	26 614
165	·3713	**3**	0·044
166	3556	**4**	1 028
167	3400	**5**	2·012
168	3244	**6**	2 997
169	3087	**7**	3·981
170	2931	**8**	4·965
171	2774	**9**	5 950
172	·2618	**10**	6 934
173	2461	**11**	7·918
174	2305	**12**	8 903
175	2148	**13**	9 887
176	1992	**14**	10·872
177	1835	**15**	11 856
Kārttika.			
178	·1679	1	12 840
179	·1522	2	13·825
180	·1366	3	14 809
181	1209	4	15·793
182	·1053	5	16·778
183	·0896	6	17·762
184	·0740	7	18·746
185	·0584	8	19·731
186	·0427	9	20·715
187	0271	10	21·699
188	·0114	11	22 684
188	·9958	12	23·668
189	·9801	13	24·652
190	·9645	14	25·637
191	·9488	15	26·621
Kārttika—cont.			
192	·9332	**1**	0 051
193	·9175	**2**	1·035
194	·9019	**3**	2 020
195	·8862	**4**	3 004
196	8706	**5**	3·988
197	8549	**6**	4 973
198	8393	**7**	5 957
199	·8236	**8**	6·941
200	·8080	**9**	7 926
201	7924	**10**	8 910
202	·7767	**11**	9 894
203	·7611	**12**	10·879
204	·7454	**13**	11 863
205	·7298	**14**	12 848
206	7141	**15**	13 832
Mārgaśirsha.			
207	6985	1	14 816
208	·6828	2	15 801
209	·6672	3	16 785
210	6515	4	17 769
211	6359	5	18 754
212	6202	6	19 738
213	6046	7	20 722
214	5889	8	21 707
215	5733	9	22 691
216	·5576	10	23 675
217	·5420	11	24 660
218	·5264	12	25·644
219	5107	13	26 628
220	4951	14	0·058
221	·4794	15	1 043
222	4638	**1**	2 027
223	4481	**2**	3 011
224	4325	**3**	3 996
225	·4168	**4**	4·980
226	4012	**5**	5 964
227	·3855	**6**	6·949
228	·3699	**7**	7 933
229	3542	**8**	8 917
230	3386	**9**	9 902
231	·3229	**10**	10 886
232	·3073	**11**	11·870
233	2916	**12**	12 855
234	·2760	**13**	13 839
235	·2604	**14**	14 824
236	2447	**15**	15 808
Pausha.			
237	·2291	1	16 792
238	·2134	2	17 777
239	·1978	3	18·761
240	1821	4	19 745
241	1665	5	20·730
242	1508	6	21 714
243	·1352	7	22·698
244	1195	8	23 683
245	·1039	9	24 667
246	·0882	10	25·651
247	·0726	11	26·636
248	·0569	12	0·065
249	·0413	13	1·050
250	·0257	14	2·034
251	·0108	15	3·019
251	·9944	**1**	4 003
252	9787	**2**	4·987
253	·9631	**3**	5·972
254	9474	**4**	6 956
255	·9318	**5**	7·940
Pausha—cont.			
256	·9161	**6**	8 925
257	·9005	**7**	9 909
258	·8848	**8**	10 893
259	·8692	**9**	11·878
260	·8535	**10**	12·862
261	8379	**11**	13·846
262	·8222	**12**	14·831
263	8066	**13**	15 815
264	·7909	**14**	16 799
265	·7753	**15**	17 784
Māgha.			
266	·7597	1	18 768
267	·7440	2	19·753
268	7284	3	20·737
269	·7127	4	21 721
270	·6971	5	22 706
271	6814	6	23 690
272	·6658	7	24 674
273	·6501	8	25 659
274	6345	9	26·643
275	·6188	10	0·078
276	6032	11	1·057
277	5875	12	2·041
278	5719	13	3·026
279	5562	14	4·010
280	5406	15	4 995
281	5249	**1**	5 979
282	·5093	**2**	6 963
283	4937	**3**	7·948
284	4780	**4**	8·932
285	4624	**5**	9·916
286	·4467	**6**	10·901
287	4311	**7**	11·885
288	·4154	**8**	12·869
289	·3998	**9**	13 854
290	3841	**10**	14 838
291	3685	**11**	15 822
292	·3528	**12**	16 807
293	·3372	**13**	17 791
294	3215	**14**	18 775
295	·3059	**15**	19 760
Phālguna.			
296	·2902	1	20 744
297	·2746	2	21·729
298	·2589	3	22 713
299	·2433	4	23·697
300	·2277	5	24·682
301	·2120	6	25 666
302	·1964	7	26·650
303	1807	8	0·080
304	·1651	9	1·064
305	·1494	10	2 049
306	·1338	11	3·033
307	·1181	12	4·017
308	·1025	13	5·002
309	·0868	14	5·986
310	·0712	15	6·971
311	·0555	**1**	7·955
312	·0399	**2**	8·939
313	·0242	**3**	9·924
314	·0086	**4**	10·908
314	·9929	**5**	11·892
315	·9773	**6**	12·877
316	·9617	**7**	13·861
317	·9460	**8**	14·845
318	·9304	**9**	15·830
319	·9147	**10**	16·814
Phālguna—cont.			
320	·8991	**11**	17·798
321	8834	**12**	18·783
322	·8678	**13**	19·767
323	·8521	**14**	20 751
324	·8365	**15**	21·786
Chaitra (when there is no adhika masa)			
325	·8208	1	22·720
326	8052	2	23 705
327	7895	3	24·689
328	·7739	4	25 673
329	7582	5	26 658
330	·7426	6	0 087
331	7269	7	1 072
332	·7113	8	2 056
333	6957	9	3 040
334	6800	10	4 025
335	·6644	11	5 009
336	6487	12	5 993
337	·6331	13	6·978
338	·6174	14	7 962
339	·6018	15	8·947
340	·5861	**1**	9 931
341	·5705	**2**	10·915
342	·5548	**3**	11·900
343	5392	**4**	12·884
344	·5235	**5**	13·868
345	5079	**6**	14·853
346	4922	**7**	15·837
347	·4766	**8**	16·821
348	·4610	**9**	17·806
349	·4453	**10**	18·790
350	4297	**11**	19·774
351	·4140	**12**	20·759
352	·3984	**13**	21·743
353	·3827	**14**	22·727
354	3671	**15**	23·712
Chaitra (when there is adhika masa).			
355	3514	1	24·696
356	·3358	2	25·681
357	·3201	3	26·665
358	3045	4	0·095
359	2888	5	1·079
360	2732	6	2·063
361	·2575	7	3·048
362	·2419	8	4·032
363	2262	9	5·016
364	·2106	10	6·001
365	·1950	11	6·985
366	1793	12	7·969
367	·1637	13	8·954
368	·1480	14	9·938
369	·1324	15	10·923
370	·1167	**1**	11·907
371	·1011	**2**	12·891
372	·0854	**3**	13·876
373	·0698	**4**	14·860
374	·0541	**5**	15·844
375	·0385	**6**	16·829
376	·0228	**7**	17·813
377	·0072	**8**	18 797
377	·9915	**9**	19 782
378	·9759	**10**	20·766
379	·9602	**11**	21·750
380	·9446	**12**	22·735
381	·9290	**13**	23 719
382	·9133	**14**	24·703
383	·8977	**15**	25·688

e—EYE-TABLE FOR TITHIS.

Moon's anomaly and equation of the centre expressed in days and fractions of a day.

(SŪRYA SIDDHĀNTA.)

Eqn.	0	1	2	3	4	5	6	7	8	9	Eqn.	9	8	7	6	5	4	3	2	1	0
—				Moon's anomaly in days.							—				Moon's anomaly in days						
·00	·000	·011	·023	·034	·046	·057	·069	·081	·092	·104	·413	7·303	7·338	7·374	7·410	7·445	7·481	7·517	7·553	7·589	7·600
·01	·115	·127	·138	·150	·162	·173	·185	·196	·208	·219	·412	7·611	7·622	7·633	7·644	7·654	7·665	7·676	7·686	7·697	7·707
·02	·231	·242	·254	·265	·277	·289	·301	·313	·324	·336	411	7·718	7·728	7·739	7·749	7·759	7·769	7·780	7·790	7·801	7·811
·03	·347	·359	·370	·382	·393	·405	·416	·428	·439	·451	410	7·822	7·832	7·843	7·853	7·863	7·873	7·880	7·887	7·893	7·900
·04	·462	·474	·485	·497	·508	·520	·531	·543	·554	·566	409	7·906	7·913	7·919	7·925	7·931	7·938	7·944	7·951	7·957	7·964
·05	·577	·589	·600	·612	·623	·634	·646	·657	·669	·680	408	7·970	7·977	7·983	7·990	7·996	8·002	8·049	8·015	8·022	8·028
·06	·692	·703	·715	·726	·738	·749	·761	·772	·784	·795	·407	8·035	8·041	8·048	8·054	8·060	8·066	8·073	8·079	8·086	8·092
·07	·807	·819	·831	·843	·855	·867	·879	·891	·903	·915	·406	8·099	8·105	8·112	8·118	8·124	8·130	8·137	8·143	8·150	8·156
·08	·927	·939	·951	·962	·974	·985	·997	1·008	1·020	1·031	405	8·161	8·165	8·170	8·175	8·179	8·183	8·188	8·193	8·197	8·202
·09	1·043	1·055	1·067	1·079	1·091	1·103	1·115	1·127	1·139	1·151	404	8·207	8·211	8·216	8·221	8·225	8·229	8·234	8·239	8·243	8·248
·10	1·163	1·175	1·187	1·199	1·211	1·223	1·235	1·247	1·259	1·271	403	8·252	8·257	8·262	8·267	8·271	8·275	8·280	8·285	8·289	8·294
·11	1·283	1·295	1·307	1·319	1·331	1·343	1·355	1·367	1·379	1·391	·402	8·299	8·303	8·308	8·313	8·317	8·321	8·326	8·331	8·335	8·340
·12	1·403	1·415	1·427	1·439	1·451	1·463	1·475	1·487	1·499	1·511	·401	8·345	8·349	8·354	8·359	8·363	8·367	8·372	8·377	8·381	8·386
·13	1·523	1·535	1·547	1·559	1·571	1·583	1·595	1·608	1·620	1·632	·400	8·391	8·395	8·400	8·405	8·409	8·413	8·418	8·423	8·427	8·432
·14	1·645	1·657	1·669	1·682	1·694	1·706	1·719	1·731	1·743	1·756	39	8·463	8·504	8·540	8·576	8·612	8·648	8·684	8·720	8·749	8·779
15	1·768	1·780	1·793	1·805	1·817	1·830	1·842	1·854	1·867	1·879	38	8·808	8·838	8·867	8·897	8·926	8·956	8·985	9·010	9·085	9·060
·16	1·891	1·904	1·916	1·929	1·941	1·954	1·966	1·979	1·991	2·004	·37	9·085	9·110	9·135	9·160	9·185	9·210	9·235	9·259	9·281	9·303
17	2·016	2·029	2·041	2·054	2·066	2·079	2·091	2·104	2·117	2·129	36	9·325	9·347	9·369	9·391	9·413	9·435	9·457	9·479	9·500	9·521
·18	2·142	2·155	2·168	2·181	2·194	2·207	2·220	2·233	2·246	2·259	·35	9·542	9·562	9·581	9·600	9·619	9·638	9·657	9·676	9·695	9·714
19	2·272	2·285	2·298	2·311	2·324	2·337	2·350	2·363	2·376	2·389	34	9·733	9·752	9·771	9·790	9·809	9·826	9·844	9·861	9·878	9·896
·20	2·402	2·415	2·428	2·441	2·454	2·467	2·480	2·493	2·506	2·519	·33	9·913	9·930	9·948	9·965	9·982	10·000	10·017	10·034	10·052	10·069
21	2·533	2·546	2·560	2·573	2·587	2·600	2·614	2·627	2·641	2·654	32	10·086	10·102	10·118	10·134	10·150	10·166	10·182	10·198	10·214	10·229
·22	2·668	2·681	2·695	2·708	2·722	2·735	2·749	2·762	2·776	2·789	31	10·245	10·260	10·276	10·291	10·307	10·323	10·338	10·353	10·368	10·383
·23	2·803	2·817	2·831	2·845	2·859	2·873	2·887	2·901	2·915	2·929	30	10·397	10·412	10·426	10·441	10·455	10·470	10·484	10·499	10·513	10·528
·24	2·943	2·957	2·971	2·985	2·999	3·013	3·027	3·041	3·055	3·070	·29	10·542	10·557	10·571	10·586	10·600	10·615	10·629	10·643	10·657	10·671
·25	3·085	3·099	3·113	3·127	3·141	3·155	3·169	3·183	3·198	3·213	28	10·685	10·699	10·712	10·726	10·739	10·753	10·766	10·780	10·793	10·807
·26	3·228	3·243	3·258	3·273	3·288	3·303	3·318	3·333	3·348	3·363	27	10·820	10·834	10·847	10·861	10·874	10·888	10·900	10·913	10·926	10·939
·27	3·378	3·393	3·408	3·423	3·437	3·453	3·468	3·484	3·499	3·515	·26	10·952	10·965	10·978	10·991	11·004	11·017	11·030	11·043	11·056	11·069
·28	3·530	3·546	3·561	3·577	3·592	3·608	3·623	3·639	3·654	3·670	·25	11·082	11·095	11·108	11·120	11·132	11·144	11·156	11·168	11·180	11·192
29	3·686	3·702	3·718	3·734	3·750	3·767	3·783	3·800	3·816	3·833	·24	11·205	11·218	11·230	11·242	11·254	11·266	11·278	11·290	11·302	11·314
·30	3·849	3·866	3·882	3·899	3·915	3·932	3·948	3·965	3·981	9·995	·23	11·326	11·338	11·350	11·362	11·374	11·386	11·398	11·410	11·422	11·434
·31	4·014	4·031	4·048	4·065	4·083	4·100	4·118	4·135	4·153	4·170	22	11·446	11·457	11·469	11·480	11·492	11·503	11·515	11·526	11·538	11·549
·32	4·188	4·205	4·223	4·241	4·259	4·277	4·295	4·313	4·331	4·349	21	11·561	11·572	11·584	11·595	11·607	11·618	11·630	11·641	11·653	11·664
·33	4·368	4·387	4·407	4·426	4·445	4·465	4·484	4·503	4·523	4·542	·20	11·676	11·687	11·698	11·709	11·720	11·731	11·742	11·753	11·764	11·775
·34	4·561	4·581	4·600	4·619	4·639	4·658	4·679	4·700	4·721	4·742	·19	11·786	11·797	11·808	11·819	11·830	11·841	11·852	11·863	11·874	11·885
·35	4·763	4·784	4·805	4·826	4·847	4·868	4·889	4·910	4·931	4·953	·18	11·896	11·907	11·918	11·929	11·940	11·951	11·962	11·974	11·984	11·995
·36	4·976	4·999	5·022	5·046	5·070	5·094	5·118	5·142	5.166	5·190	17	12·006	12·016	12·027	12·038	12·048	12·059	12·069	12·080	12·090	12·101
·37	5·214	5·238	5·262	5·288	5·315	5·342	5·369	5·396	5·423	5·450	·16	12·111	12·122	12·132	12·143	12·153	12·164	12·174	12·185	12·195	12·206
·38	5·477	5·504	5·531	5·558	5·589	5·621	5·652	5·684	5·715	5·747	·15	12·216	12·226	12·237	12·247	12·257	12·268	12·278	12·288	12·299	12·309
·39	5·778	5·810	5·841	5·879	5·917	5·955	5·993	6·031	6·069	6·107	·14	12·319	12·330	12·340	12·350	12·361	12·371	12·381	12·392	12·402	12·412
·400	6·145	6·150	6·154	6·159	6·164	6·169	6·174	6·179	6·184	6·188	·13	12·423	12·433	12·443	12·454	12·464	12·474	12·484	12·494	12·504	12·514
·401	6·193	6·198	6·202	6·207	6·212	6·216	6·222	6·227	6·232	6·236	12	12·524	12·534	12·544	12·554	12·564	12·574	12·584	12·594	12·604	12·614
·402	6·241	6·246	6·250	6·255	6·260	6·264	6·270	6·275	6·280	6·284	11	12·624	12·634	12·644	12·654	12·664	12·674	12·684	12·694	12·704	12·714
403	6·289	6·294	6·298	6·303	6·308	6·312	6·318	6·323	6·328	6·333	10	12·724	12·734	12·744	12·754	12·764	12·774	12·784	12·794	12·804	12·814
·4C4	6·337	6·342	6·346	6·351	6·356	6·360	6·366	6·371	6·376	6·381	09	12·824	12·834	12·844	12·854	12·864	12·874	12·884	12·894	12·904	12·914
·405	6·386	6·391	6·395	6·399	6·404	6·408	6·414	6·419	6·424	6·428	08	12·924	12·933	12·943	12·952	12·962	12·971	12·981	12·990	13·000	13·010
·406	6·433	6·439	6·446	6·452	6·459	6·465	6·473	6·479	6·486	6·492	·07	13·020	13·030	13·040	13·050	13·060	13·070	13·080	13·090	13·100	13·110
·407	6·499	6·505	6·512	6·518	6·525	6·531	6·539	6·545	6·552	6·558	·06	13·120	13·129	13·139	13·148	13·158	13·167	13·177	13·186	13·196	13·205
408	6·565	6·571	6·578	6·584	6·591	6·597	6·605	6·612	6·618	6·625	05	13·215	13·224	13·234	13·243	13·253	13·262	13·271	13·281	13·290	13·300
·409	6·631	6·638	6·644	6·651	6·657	6·664	6·671	6·678	6·684	6·691	·04	13·309	13·319	13·328	13·338	13·347	13·357	13·366	13·376	13·385	13·395
410	6·697	6·704	6·710	6·717	6·724	6·734	6·746	6·756	6·767	6·777	03	13·404	13·414	13·423	13·433	13·442	13·452	13·461	13·471	13·480	13·490
411	6·788	6·798	6·809	6·819	6·830	6·840	6·852	6·862	6·873	6·883	·02	13·499	13·509	13·518	13·528	13·538	13·548	13·558	13·567	13·577	13·586
·412	6·894	6·904	6·915	6·925	6·936	6·947	6·959	6·970	6·981	6·992	·01	13·596	13·605	13·615	13·624	13·634	13·643	13·653	13·663	13·672	13·682
·413	7·003	7·014	7·050	7·086	7·122	7·158	7·195	7·231	7·267	7·303	00	13·691	13·701	13·710	13·720	13·730	13·739	13·749	13·758	13·768	13·777

e—EYE-TABLE FOR TITHIS—*continued.*

Moon's anomaly and equation of the centre expressed in days and fractions of a day.

(SŪRYA SIDDHĀNTA.)

Eqn. +	0	1	2	3	4	5	6	7	8	9	Eqn. +	9	8	7	6	5	4	3	2	1	0
	Moon's anomaly in days.											Moon's anomaly in days.									
·00	13·777[1]	13·786	13·796	13·805	13·815	13·824	13·834	13·844	13·853	13·863	·413	20·252	20·287	20·323	20·359	20·396	20·432	20·468	20·504	20·540	20·551
·01	13·872	13·882	13·891	13·901	13·911	13·920	13·930	13·939	13·949	13·958	·412	20·562	20·573	20·584	20·595	20·607	20·618	20·629	20·639	20·650	20·660
·02	13·968	13·977	13·987	13·996	14·006	14·016	14·026	14·036	14·045	14·055	·411	20·671	20·681	20·692	20·702	20·714	20·724	20·735	20·745	20·756	20·766
·03	14·064	14·074	14·083	14·093	14·102	14·112	14·121	14·131	14·140	14·150	·410	20·777	20·787	20·798	20·808	20·820	20·830	20·837	20·844	20·850	20·857
·04	14·159	14·169	14·178	14·188	14·197	14·207	14·216	14·226	14·235	14·245	·409	20·863	20·870	20·876	20·883	20·890	20·897	20·903	20·910	20·916	20·923
·05	14·255	14·264	14·273	14·283	14·292	14·301	14·311	14·320	14·330	14·339	·408	20·929	20·936	20·942	20·949	20·957	20·963	20·970	20·976	20·983	20·989
·06	14·349	14·358	14·368	14·377	14·387	14·396	14·406	14·415	14·425	14·434	·407	20·996	21·002	21·009	21·015	21·023	21·029	21·036	21·042	21·049	21·055
·07	14·444	14·454	14·464	14·474	14·484	14·494	14·504	14·514	14·524	14·534	·406	21·062	21·068	21·075	21·081	21·089	21·095	21·102	21·108	21·115	21·121
·08	14·544	14·554	14·564	14·573	14·583	14·592	14·602	14·611	14·621	14·630	·405	21·125	21·129	21·134	21·139	21·145	21·149	21·154	21·159	21·163	21·168
·09	14·640	14·650	14·660	14·670	14·680	14·690	14·700	14·710	14·720	14·730	·404	21·178	21·177	21·182	21·187	21·193	21·197	21·202	21·207	21·211	21·216
·10	14·740	14·750	14·760	14·770	14·780	14·790	14·800	14·810	14·820	14·830	·403	21·220	21·225	21·230	21·235	21·241	21·245	21·250	21·255	21·259	21·264
·11	14·840	14·850	14·860	14·870	14·880	14·890	14·900	14·910	14·920	14·930	·402	21·269	21·273	21·278	21·283	21·289	21·293	21·298	21·303	21·307	21·312
·12	14·940	14·950	14·960	14·970	14·980	14·990	15·000	15·010	15·020	15·030	·401	21·317	21·321	21·326	21·331	21·337	21·342	21·347	21·352	21·356	21·361
·13	15·040	15·050	15·060	15·070	15·080	15·090	15·100	15·111	15·121	15·131	·400	21·366	21·370	21·375	21·380	21·386	21·390	21·395	21·400	21·404	21·409
·14	15·142	15·152	15·163	15·173	15·183	15·193	15·204	15·214	15·224	15·235	·39	21·447	21·485	21·523	21·561	21·599	21·637	21·675	21·713	21·744	21·776
·15	15·245	15·255	15·266	15·276	15·286	15·297	15·307	15·317	15·328	15·338	·38	21·807	21·839	21·870	21·902	21·933	21·965	21·996	22·023	22·050	22·077
·16	15·348	15·359	15·369	15·380	15·390	15·401	15·411	15·422	15·432	15·443	·37	22·104	22·131	22·158	22·185	22·212	22·239	22·266	22·292	22·316	22·340
·17	15·453	15·464	15·474	15·485	15·495	15·506	15·516	15·527	15·538	15·548	·36	22·364	22·388	22·412	22·436	22·460	22·484	22·508	22·532	22·555	22·578
·18	15·559	15·570	15·581	15·592	15·603	15·614	15·625	15·636	15·647	15·658	·35	22·601	22·623	22·644	22·665	22·686	22·707	22·728	22·749	22·770	22·791
·19	15·669	15·680	15·691	15·702	15·713	15·724	15·735	15·746	15·757	15·768	·34	22·812	22·833	22·854	22·875	22·896	22·915	22·935	22·954	22·973	22·993
·20	15·779	15·790	15·801	15·812	15·823	15·834	15·845	15·856	15·867	15·878	·33	23·012	23·031	23·051	23·070	23·089	23·109	23·128	23·147	23·167	23·186
·21	15·890	15·901	15·913	15·924	15·936	15·947	15·959	15·970	15·982	15·993	·32	23·205	23·223	23·241	23·259	23·277	23·295	23·313	23·331	23·349	23·366
·22	16·005	16·016	16·028	16·039	16·051	16·062	16·074	16·085	16·097	16·108	·31	23·384	23·401	23·419	23·436	23·454	23·471	23·489	23·506	23·523	23·540
·23	16·120	16·132	16·144	16·156	16·168	16·180	16·192	16·204	16·216	16·228	·30	23·556	23·573	23·589	23·606	23·622	23·639	23·655	23·672	23·688	23·705
·24	16·240	16·252	16·264	16·276	16·288	16·300	16·312	16·324	16·336	16·349	·29	23·721	23·738	23·754	23·771	23·787	23·804	23·820	23·836	23·852	23·868
25	16·362	16·374	16·386	16·398	16·410	16·422	16·434	16·446	16·459	16·472	28	23·884	23·900	23·915	23·931	23·946	23·962	23·977	23·993	24·008	24·024
·26	16·485	16·498	16·511	16·524	16·587	16·550	16·563	16·576	16·589	16·602	27	24·039	24·055	24·070	24·086	24·101	24·117	24·131	24·146	24·161	24·176
·27	16·615	16·628	16·641	16·654	16·666	16·680	16·693	16·707	16·720	16·734	26	24·191	24·206	24·221	24·236	24·251	24·266	24·281	24·296	24·311	24·326
·28	16·747	16·761	16·774	16·788	16·801	16·815	16·828	16·842	16·855	16·869	·25	24·341	24·356	24·371	24·385	24·399	24·413	24·427	24·441	24·455	24·469
·29	16·883	16·897	16·911	16·926	16·940	16·955	16·969	16·984	16·998	17·013	·24	24·484	24·499	24·513	24·527	24·541	24·555	24·569	24·583	24·597	24·611
·30	17·027	17·042	17·056	17·071	17·085	17·100	17·114	17·129	17·143	17·158	·23	24·625	24·639	24·653	24·667	24·681	24·695	24·709	24·723	24·737	24·751
·31	17·172	17·187	17·202	17·217	17·233	17·248	17·264	17·279	17·295	17·310	·22	24·765	24·778	24·792	24·805	24·819	24·832	24·846	24·859	24·873	24·886
·32	17·326	17·341	17·357	17·373	17·389	17·405	17·421	17·437	17·453	17·469	·21	24·900	24·913	24·927	24·940	24·954	24·967	24·981	24·994	25·008	25·021
·33	17·486	17·503	17·521	17·538	17·555	17·573	17·590	17·607	17·625	17·642	·20	25·035	25·048	25·061	25·074	25·087	25·100	25·113	25·126	25·139	25·152
·34	17·659	17·677	17·694	17·711	17·729	17·746	17·765	17·784	17·803	17·822	19	25·165	25·178	25·191	25·204	25·217	25·230	25·243	25·256	25·269	25·282
·35	17·841	17·860	17·879	17·898	17·917	17·936	17·955	17·974	17·993	18·013	·18	25·295	25·308	25·321	25·334	25·347	25·360	25·373	25·386	25·399	25·412
·36	18·034	18·055	18·076	18·098	18·120	18·142	18·164	18·186	18·208	18·230	17	25·425	25·437	25·450	25·463	25·475	25·488	25·500	25·513	25·525	25·538
·37	18·252	18·274	18·296	18·320	18·345	18·370	18·395	18·420	18·445	18·470	·16	25·550	25·563	25·575	25·588	25·600	25·613	25·625	25·638	25·650	25·663
·38	18·495	18·520	18·545	18·570	18·599	18·629	18·658	18·688	18·717	18·747	15	25·675	25·687	25·700	25·712	25·724	25·737	25·749	25·761	25·774	25·786
39	18·776	18·806	18·835	18·871	18·907	18·943	18·979	19·015	19·051	19·087	14	25·798	25·811	25·823	25·835	25·848	25·860	25·872	25·885	25·897	25·909
·400	19·123	19·128	19·132	19·137	19·142	19·146	19·150	19·155	19·160	19·164	13	25·922	25·934	25·946	25·959	25·971	25·983	25·995	26·007	26·019	26·031
·401	19·169	19·174	19·178	19·183	19·188	19·193	19·197	19·202	19·207	19·211	·12	26·043	26·055	26·067	26·079	26·091	26·103	26·115	26·127	26·139	26·151
·402	19·216	19·221	19·225	19·230	19·235	19·239	19·243	19·248	19·253	19·257	·11	26·163	26·175	26·187	26·199	26·211	26·223	26·235	26·247	26·259	26·271
·403	19·262	19·267	19·271	19·276	19·281	19·285	19·289	19·294	19·299	19·304	·10	26·283	26·295	26·307	26·319	26·331	26·343	26·355	26·367	26·379	26·391
·404	19·308	19·313	19·317	19·322	19·327	19·331	19·335	19·340	19·345	19·349	09	26·403	26·415	26·427	26·439	26·451	26·463	26·475	26·487	26·499	26·511
·405	19·354	19·359	19·363	19·368	19·373	19·377	19·381	19·386	19·391	19·395	08	26·523	26·534	26·546	26·557	26·569	26·580	26·592	26·603	26·615	26·627
·406	19·399	19·405	19·412	19·418	19·425	19·431	19·437	19·443	19·450	19·456	·07	26·639	26·651	26·663	26·675	26·687	26·699	26·711	26·723	26·735	26·747
·407	19·463	19·469	19·476	19·482	19·489	19·495	19·501	19·507	19·514	19·520	·06	26·759	26·770	26·782	26·793	26·805	26·816	26·828	26·839	26·851	26·862
·408	19·527	19·533	19·540	19·546	19·553	19·559	19·565	19·572	19·578	19·585	05	26·874	26·885	26·897	26·908	26·920	26·931	26·942	26·954	26·965	26·977
·409	19·591	19·598	19·604	19·611	19·617	19·624	19·629	19·636	19·642	19·649	·04	26·988	27·000	27·011	27·023	27·034	27·046	27·057	27·069	27·080	27·092
·410	19·655	19·662	19·668	19·675	19·682	19·692	19·702	19·712	19·723	19·733	·03	27·103	27·115	27·126	27·138	27·149	27·161	27·172	27·184	27·195	27·207
·411	19·744	19·754	19·765	19·775	19·786	19·796	19·806	19·816	19·827	19·837	02	27·218	27·230	27·243	27·254	27·266	27·278	27·290	27·301	27·313	27·324
·412	19·848	19·858	19·869	19·879	19·890	19·901	19·911	19·922	19·933	19·944	·01	27·336	27·347	27·359	27·370	27·382	27·393	27·405	27·417	27·428	27·440
·413	19·955	19·966	20·002	20·038	20·074	20·110	20·145	20·181	20·217	20·252	00	27·451	27·463	27·474	27·486	27·498	27·509	27·521	27·532	27·544	27·555

f—EYE-TABLE FOR NAKSHATRAS.

Moon's anomaly and moon's equation of the centre in days and fractions of a day.

(SŪRYA SIDDHĀNTA.)

Eqn.	0	1	2	3	4	5	6	7	8	9
—				Moon's anomaly in days.						
·00	0·000	0·012	0·024	0·037	0·049	0·061	0·074	0·086	0·098	0·111
·01	0·123	0·135	0·148	0·160	0·173	0·185	0·198	0·210	0·223	0·236
·02	0·248	0·260	0·272	0·285	0·297	0·310	0·322	0·335	0·347	0·360
·03	0·372	0·384	0·397	0·409	0·421	0·434	0·446	0·459	0·471	0·484
·04	0·496	0·508	0·520	0·533	0·545	0·557	0·570	0·582	0·594	0·607
·05	0·619	0·631	0·643	0·655	0·668	0·680	0·693	0·705	0·717	0·730
·06	0·742	0·755	0·768	0·780	0·793	0·806	0·818	0·831	0·844	0·856
·07	0·869	0·882	0·895	0·907	0·920	0·933	0·945	0·958	0·971	0·983
·08	0·996	1·009	1·022	1·034	1·047	1·060	1·072	1·085	1·098	1·110
·09	1·123	1·135	1·148	1·161	1·174	1·187	1·200	1·213	1·226	1·239
·10	1·252	1·264	1·277	1·290	1·303	1·316	1·329	1·342	1·355	1·368
·11	1·381	1·393	1·406	1·419	1·432	1·445	1·458	1·471	1·484	1·497
12	1·510	1·523	1·536	1·549	1·562	1·575	1·588	1·601	1·614	1·627
·13	1·640	1·653	1·666	1·680	1·693	1·706	1·720	1·733	1·746	1·760
·14	1·773	1·786	1·799	1·812	1·826	1·839	1·852	1·865	1·878	1·891
·15	1·905	1·918	1·932	1·945	1·959	1·972	1·986	1·999	2·013	2·026
·16	2·040	2·053	2·067	2·080	2·094	2·107	2·121	2·134	2·148	2·162
·17	2·176	2·190	2·204	2·218	2·232	2·246	2·260	2·274	2·288	2·302
·18	2·316	2·330	2·344	2·358	2·372	2·386	2·400	2·414	2·428	2·442
·19	2·457	2·471	2·485	2·500	2·514	2·528	2·543	2·557	2·571	2·585
·20	2·600	2·614	2·629	2·643	2·658	2·672	2·687	2·701	2·716	2·730
·21	2·745	2·759	2·774	2·789	2·803	2·818	2·833	2·848	2·863	2·877
·22	2·693	2·908	2·923	2·938	2·953	2·969	2·984	2·999	3·014	3·029
·23	3·045	3·060	3·076	3·091	3·107	3·122	3·138	3·153	3·169	3·184
·24	3·200	3·216	3·232	3·248	3·264	3·280	3·296	3·312	3·328	3·344
·25	3·360	3·377	3·393	3·410	3·426	3·443	3·459	3·476	3·492	3·509
·26	3·525	3·542	3·559	3·575	3·592	3·609	3·625	3·642	3·659	3·676
·27	3·693	3·711	3·729	3·746	3·764	3·782	3·799	3·817	3·835	3·852
·28	3·870	3·887	3·905	3·923	3·941	3·959	3·977	3·995	4·013	4·031
·29	4·049	4·067	4·086	4·105	4·124	4·143	4·160	4·179	4·198	4·218
·30	4·238	4·258	4·278	4·299	4·319	4·340	4·360	4·381	4·401	4·422
·31	4·442	4·462	4·483	4·504	4·525	4·546	4·567	4·588	4·609	4·630
·32	4·651	4·673	4·696	4·718	4·741	4·763	4·786	4·808	4·831	4·854
·33	4·877	4·902	4·927	4·952	4·977	5·002	5·027	5·052	5·077	5·102
·34	5·127	5·154	5·182	5·209	5·237	5·264	5·292	5·319	5·347	5·375
·35	5·403	5·434	5·465	5·497	5·529	5·561	5·593	5·625	5·657	5·689
·36	5·721	5·760	5·799	5·838	5·877	5·916	5·955	5·994	6·033	6·072
370	6·111	6·115	6·120	6·124	6·129	6·135	6·141	6·147	6·152	6·158
·371	6·163	6·168	6·172	6·178	6·184	6·190	6·196	6·200	6·205	6·210
·372	6·215	6·220	6·225	6·230	6·234	6·240	6·246	6·252	6·257	6·263
·373	6·269	6·274	6·279	6·283	6·287	6·293	6·298	6·303	6·308	6·313
·374	6·318	6·323	6·328	6·333	6·338	6·345	6·350	6·355	6·360	6·365
·375	6·370	6·375	6·380	6·385	6·390	6·397	6·403	6·409	6·416	6·422
·376	6·429	6·436	6·443	6·450	6·457	6·465	6·472	6·479	6·486	6·493
·377	6·500	6·507	6·514	6·521	6·528	6·536	6·543	6·550	6·557	6·564
·378	6·571	6·578	6·585	6·592	6·599	6·607	6·614	6·621	6·628	6·635
·379	6·643	6·651	6·659	6·668	6·676	6·685	6·694	6·702	6·710	6·719
·380	6·727	6·738	6·749	6·761	6·772	6·784	6·796	6·807	6·818	6·830
·381	6·841	6·853	6·865	6·876	6·888	6·900	6·912	6·923	6·935	6·947
·382	6·959	6·971	6·983	7·019	7·055	7·092	7·128	7·164	7·200	7·236
·383	7·272									

Eqn.	9	8	7	6	5	4	3	2	1	0
—				Moon's anomaly in days.						
·383										7·272
382	7·308	7·344	7·380	7·416	7·452	7·487	7·523	7·558	7·572	7·582
·381	7·594	7·606	7·618	7·629	7·641	7·651	7·663	7·674	7·685	7·697
·380	7·709	7·721	7·732	7·743	7·755	7·765	7·776	7·788	7·799	7·810
·379	7·818	7·827	7·835	7·843	7·852	7·859	7·867	7·876	7·884	7·892
·378	7·900	7·907	7·914	7·921	7·928	7·934	7·941	7·948	7·955	7·962
·377	7·969	7·976	7·983	7·990	7·997	8·003	8·010	8·017	8·024	8·031
·376	8·038	8·045	8·052	8·059	8·066	8·072	8·079	8·086	8·093	8·100
·375	8·107	8·113	8·120	8·126	8·132	8·137	8·142	8·147	8·152	8·157
·374	8·162	8·167	8·172	8·177	8·182	8·187	8·192	8·197	8·202	8·207
·373	8·212	8·217	8·222	8·227	8·232	8·236	8·240	8·244	8·249	8·254
·372	8·260	8·266	8·271	8·277	8·283	8·287	8·291	8·296	8·301	8·306
371	8·311	8·316	8·321	8·325	8·331	8·335	8·341	8·347	8·351	8·356
·370	8·361	8·367	8·372	8·378	8·384	8·388	8·393	8·397	8·402	8·406
·36	8·443	8·480	8·517	8·554	8·591	8·628	8·665	8·702	8·739	8·776
·35	8·806	8·836	8·866	8·896	8·926	8·956	8·986	9·016	9·045	9·074
·34	9·100	9·126	9·152	9·177	9·203	9·228	9·254	9·279	9·305	9·330
33	9·353	9·376	9·399	9·422	9·445	9·468	9·491	9·514	9·537	9·560
·32	9·581	9·602	9·623	9·643	9·664	9·684	9·705	9·725	9·746	9·766
·31	9·785	9·804	9·823	9·842	9·861	9·880	9·899	9·918	9·937	9·955
·30	9·973	9·992	10·010	10·039	10·057	10·066	10·084	10·103	10·121	10·139
·29	10·157	10·175	10·192	10·209	10·224	10·241	10·258	10·275	10·292	10·308
·28	10·324	10·340	10·356	10·372	10·388	10·404	10·420	10·436	10·452	10·467
27	10·483	10·498	10·514	10·530	10·545	10·561	10·577	10·592	10·608	10·624
26	10·639	10·654	10·669	10·684	10·698	10·713	10·728	10·742	10·757	10·772
25	10·786	10·801	10·815	10·830	10·844	10·859	10·873	10·888	10·902	10·916
24	10·931	10·945	10·959	10·973	10·987	11·001	11·015	11·029	11·043	11·057
23	11·071	11·084	11·098	11·111	11·125	11·138	11·152	11·165	11·179	11·192
22	11·206	11·219	11·232	11·245	11·258	11·272	11·285	11·298	11·311	11·324
21	11·338	11·350	11·363	11·376	11·388	11·401	11·414	11·426	11·439	11·452
·20	11·465	11·477	11·490	11·502	11·515	11·527	11·540	11·552	11·565	11·577
19	11·590	11·602	11·614	11·626	11·639	11·651	11·663	11·676	11·688	11·700
18	11·713	11·725	11·737	11·749	11·761	11·773	11·785	11·797	11·809	11·821
17	11·833	11·845	11·857	11·869	11·881	11·893	11·905	11·917	11·929	11·941
·16	11·953	11·965	11·977	11·988	12·000	12·011	12·023	12·034	12·046	12·057
15	12·069	12·080	12·092	12·103	12·115	12·126	12·138	12·149	12·161	12·172
14	12·184	12·195	12·206	12·217	12·228	12·239	12·251	12·262	12·273	12·284
·13	12·295	12·307	12·318	12·329	12·341	12·352	12·363	12·375	12·386	12·397
12	12·408	12·419	12·430	12·441	12·452	12·463	12·474	12·485	12·496	12·507
11	12·518	12·529	12·540	12·551	12·562	12·573	12·584	12·595	12·606	12·616
·10	12·627	12·638	12·649	12·660	12·671	12·682	12·693	12·704	12·715	12·725
·09	12·736	12·747	12·758	12·769	12·780	12·791	12·802	12·813	12·824	12·834
08	12·845	12·855	12·866	12·877	12·887	12·898	12·909	12·919	12·930	12·941
07	12·952	12·962	12·973	12·984	12·994	13·005	13·016	13·026	13·037	13·048
06	13·059	13·069	13·080	13·091	13·101	13·112	13·123	13·133	13·144	13·155
05	13·165	13·176	13·186	13·196	13·207	13·217	13·227	13·238	13·248	13·258
04	13·268	13·279	13·289	13·299	13·310	13·320	13·330	13·341	13·351	13·361
03	13·371	13·382	13·392	13·403	13·413	13·424	13·434	13·444	13·455	13·465
02	13·475	13·486	13·496	13·507	13·517	13·528	13·538	13·549	13·559	13·569
01	13·579	13·590	13·601	13·611	13·622	13·632	13·643	13·653	13·664	13·674
00	13·684	13·695	13·705	13·715	13·726	13·736	13·746	13·757	13·767	13·777

f—EYE-TABLE FOR NAKSHATRAS—*continued.*

Moon's anomaly and moon's equation of the centre in days and fractions of a day.

(SŪRYA SIDDHĀNTA.)

Moon's anomaly in days

Eqn. +	0	1	2	3	4	5	6	7	8	9
·00	13·777	13·787	13·797	13·808	13·818	13·828	13·839	13·849	13·859	13·870
·01	13·880	13·890	13·901	13·911	13·922	13·932	13·943	13·953	13·964	13·975
·02	13·985	13·995	14·005	14·016	14·026	14·037	14·047	14·058	14·068	14·079
·03	14·089	14·099	14·110	14·120	14·130	14·141	14·151	14·162	14·172	14·183
·04	14·193	14·203	14·213	14·224	14·234	14·244	14·255	14·265	14·275	14·286
·05	14·296	14·306	14·316	14·327	14·337	14·347	14·358	14·368	14·378	14·389
·06	14·399	14·410	14·421	14·431	14·442	14·453	14·463	14·474	14·485	14·495
·07	14·506	14·517	14·528	14·538	14·549	14·560	14·570	14·581	14·592	14·602
·08	14·613	14·624	14·635	14·645	14·656	14·667	14·677	14·688	14·699	14·709
·09	14·720	14·730	14·741	14·752	14·763	14·774	14·785	14·796	14·807	14·818
·10	14·829	14·839	14·850	14·861	14·872	14·883	14·894	14·905	14·916	14·927
·11	14·938	14·948	14·959	14·970	14·981	14·992	15·003	15·014	15·025	15·036
·12	15·047	15·058	15·069	15·080	15·091	15·102	15·113	15·124	15·135	15·146
·13	15·157	15·168	15·179	15·191	15·202	15·213	15·225	15·236	15·247	15·259
·14	15·270	15·281	15·292	15·303	15·315	15·326	15·337	15·348	15·359	15·370
·15	15·382	15·393	15·405	15·416	15·428	15·439	15·451	15·462	15·474	15·485
·16	15·497	15·508	15·520	15·531	15·543	15·554	15·566	15·577	15·589	15·601
·17	15·613	15·625	15·637	15·649	15·661	15·673	15·685	15·697	15·709	15·721
·18	15·733	15·745	15·757	15·769	15·781	15·793	15·805	15·817	15·829	15·841
·19	15·854	15·866	15·878	15·891	15·903	15·915	15·928	15·940	15·952	15·964
·20	15·977	15·989	16·002	16·014	16·027	16·039	16·052	16·064	16·077	16·089
·21	16·102	16·115	16·128	16·140	16·153	16·166	16·178	16·191	16·204	16·216
·22	16·230	16·243	16·256	16·269	16·282	16·296	16·309	16·322	16·335	16·348
·23	16·362	16·375	16·389	16·402	16·416	16·429	16·443	16·456	16·470	16·483
·24	16·497	16·511	16·525	16·539	16·553	16·567	16·581	16·595	16·609	16·623
·25	16·638	16·652	16·666	16·681	16·695	16·710	16·724	16·739	16·753	16·768
·26	16·782	16·797	16·812	16·826	16·841	16·856	16·870	16·885	16·900	16·915
·27	16·930	16·946	16·962	16·977	16·993	17·009	17·024	17·040	17·056	17·071
·28	17·087	17·102	17·118	17·134	17·150	17·166	17·182	17·198	17·214	17·230
·29	17·246	17·263	17·280	17·297	17·314	17·331	17·348	17·365	17·382	17·399
·30	17·416	17·434	17·452	17·471	17·489	17·508	17·526	17·545	17·563	17·582
·31	17·600	17·618	17·637	17·656	17·675	17·694	17·713	17·732	17·751	17·770
·32	17·789	17·809	17·830	17·850	17·871	17·891	17·912	17·932	17·953	17·974
·33	17·995	18·018	18·041	18·064	18·087	18·110	18·133	18·156	18·179	18·202
·34	18·225	18·250	18·276	18·301	18·327	18·352	18·378	18·403	18·429	18·455
·35	18·481	18·510	18·539	18·569	18·599	18·629	18·659	18·689	18·719	18·749
·36	18·779	18·816	18·853	18·890	18·927	18·964	19·001	19·038	19·075	19·112
·370	19·149	19·153	19·158	19·162	19·167	19·172	19·177	19·183	19·188	19·194
·371	19·199	19·204	19·208	19·214	19·220	19·226	19·231	19·235	19·240	19·245
·372	19·250	19·255	19·260	19·265	19·269	19·274	19·279	19·285	19·290	19·296
·373	19·302	19·307	19·312	19·316	19·320	19·325	19·329	19·334	19·339	19·344
·374	19·349	19·354	19·359	19·364	19·369	19·375	19·379	19·384	19·389	19·394
·375	19·399	19·404	19·409	19·414	19·419	19·425	19·430	19·436	19·442	19·448
·376	19·455	19·462	19·469	19·476	19·483	19·490	19·496	19·503	19·510	19·517
·377	19·524	19·531	19·538	19·545	19·552	19·559	19·565	19·572	19·579	19·586
·378	19·593	19·600	19·607	19·614	19·621	19·628	19·634	19·641	19·648	19·655
·379	19·663	19·671	19·679	19·688	19·696	19·704	19·712	19·720	19·728	19·737
·380	19·745	19·756	19·767	19·779	19·790	19·801	19·812	19·823	19·834	19·845
·381	19·858	19·870	19·882	19·893	19·905	19·916	19·927	19·938	19·950	19·962
·382	19·974	19·986	19·997	20·032	20·068	20·104	20·139	20·175	20·211	20·247
·383	20·283									

Moon's anomaly in days.

Eqn. +	9	8	7	6	5	4	3	2	1	0
·383										20·283
·382	20·319	20·355	20·391	20·427	20·464	20·500	20·536	20·571	20·582	20·594
·381	20·606	20·618	20·630	20·641	20·654	20·655	20·677	20·688	20·700	20·712
·380	20·724	20·736	20·747	20·759	20·771	20·782	20·793	20·805	20·816	20·827
·379	20·835	20·844	20·852	20·860	20·870	20·878	20·886	20·895	20·903	20·911
·378	20·919	20·926	20·933	20·940	20·948	20·955	20·962	20·969	20·976	20·983
·377	20·990	20·997	21·004	21·011	21·019	21·026	21·033	21·040	21·047	21·054
·376	21·061	21·068	21·075	21·082	21·090	21·097	21·104	21·111	21·118	21·125
·375	21·132	21·138	21·141	21·150	21·157	21·163	21·168	21·173	21·178	21·183
·374	21·188	21·193	21·198	21·203	21·209	21·215	21·220	21·225	21·230	21·235
·373	21·240	21·245	21·250	21·255	21·261	21·266	21·270	21·274	21·279	21·284
·372	21·290	21·296	21·301	21·307	21·314	21·319	21·323	21·328	21·333	21·338
·371	21·343	21·348	21·353	21·357	21·364	21·370	21·376	21·382	21·386	21·391
·370	21·396	21·402	21·407	21·413	21·420	21·425	21·430	21·434	21·439	21·443
·36	21·482	21·521	21·560	21·599	21·638	21·677	21·716	21·755	21·794	21·833
·35	21·865	21·897	21·929	21·961	21·993	22·025	22·057	22·089	22·120	22·151
·34	22·179	22·207	22·235	22·262	22·290	22·317	22·345	22·372	22·400	22·427
·33	22·452	22·477	22·502	22·527	22·552	22·577	22·602	22·627	22·652	22·677
·32	22·700	22·723	22·746	22·768	22·791	22·813	22·836	22·858	22·881	22·903
·31	22·924	22·945	22·966	22·987	23·008	23·029	23·050	23·071	23·092	23·112
·30	23·132	23·153	23·173	23·194	23·214	23·235	23·255	23·276	23·296	23·316
·29	23·336	23·356	23·375	23·394	23·411	23·430	23·449	23·468	23·487	23·505
·28	23·523	23·541	23·559	23·577	23·595	23·613	23·631	23·649	23·667	23·684
·27	23·702	23·719	23·737	23·755	23·772	23·790	23·808	23·825	23·843	23·861
·26	23·878	23·895	23·912	23·929	23·945	23·962	23·979	23·995	24·012	24·029
·25	24·045	24·062	24·078	24·095	24·111	24·128	24·144	24·161	24·177	24·193
·24	24·210	24·226	24·242	24·258	24·274	24·290	24·306	24·322	24·338	24·354
·23	24·370	24·385	24·401	24·416	24·432	24·447	24·463	24·478	24·494	24·509
·22	24·525	24·540	24·555	24·570	24·585	24·601	24·616	24·631	24·646	24·661
·21	24·677	24·691	24·706	24·721	24·735	24·750	24·765	24·779	24·794	24·809
·20	24·824	24·838	24·853	24·867	24·882	24·896	24·911	24·925	24·940	24·954
·19	24·969	24·983	24·997	25·011	25·026	25·040	25·054	25·069	25·083	25·097
·18	25·112	25·126	25·140	25·154	25·168	25·182	25·196	25·210	25·224	25·238
·17	25·252	25·266	25·280	25·294	25·308	25·322	25·336	25·350	25·364	25·378
·16	25·392	25·406	25·420	25·433	25·447	25·460	25·474	25·487	25·501	25·514
·15	25·528	25·541	25·555	25·568	25·582	25·595	25·609	25·622	25·636	25·649
·14	25·663	25·676	25·689	25·702	25·715	25·728	25·742	25·755	25·768	25·781
·13	25·794	25·808	25·821	25·834	25·848	25·861	25·874	25·888	25·901	25·914
·12	25·927	25·940	25·953	25·966	25·979	25·992	26·005	26·018	26·031	26·044
·11	26·057	26·070	26·083	26·096	26·109	26·122	26·135	26·148	26·161	26·173
·10	26·186	26·199	26·212	26·225	26·238	26·251	26·264	26·277	26·290	26·302
·09	26·315	26·328	26·341	26·354	26·367	26·380	26·393	26·406	26·419	26·431
·08	26·444	26·456	26·469	26·482	26·494	26·507	26·520	26·532	26·545	26·558
·07	26·571	26·583	26·596	26·609	26·621	26·634	26·647	26·659	26·672	26·685
·06	26·698	26·710	26·723	26·736	26·748	26·761	26·774	26·786	26·799	26·812
·05	26·824	26·837	26·849	26·861	26·874	26·886	26·898	26·911	26·923	26·935
·04	26·947	26·960	26·972	26·984	26·997	27·009	27·021	27·034	27·046	27·058
·03	27·070	27·083	27·095	27·108	27·120	27·133	27·145	27·157	27·170	27·182
·02	27·194	27·207	27·219	27·232	27·244	27·257	27·269	27·282	27·294	27·307
·01	27·319	27·332	27·345	27·357	27·370	27·382	27·395	27·407	27·420	27·432
·00	27·444	27·457	27·469	27·481	27·494	27·506	27·518	27·531	27·543	27·555

g—EYE-TABLE FOR YOGAS.

Moon's anomaly and moon's equation of the centre in days and fractions of a day.

(SŪRYA SIDDHĀNTA.)

Eqn.	0	1	2	3	4	5	6	7	8	9	Eqn.	9	8	7	6	5	4	3	2	1	0
—	Moon's anomaly in days										—	Moon's anomaly in days.									
·00	·000	·013	·026	·039	·052	·065	·078	·091	·104	·117	·356	...	...	...	...	...	...	7·245	7·286	7·327	7·368
·01	·130	·143	·156	·169	·183	·196	·209	·223	·236	·249	·355	7·384	7·399	7·415	7·431	7·446	7·462	7·478	7·494	7·509	7·525
·02	·262	·275	·288	·302	·316	·329	·343	·356	·369	·383	·354	7·541	7·556	7·572	7·588	7·603	7·619	7·635	7·651	7·666	7·682
·03	·396	·409	·423	·436	·449	·463	·476	·489	·503	·516	·353	7·698	7·713	7·729	7·745	7·760	7·776	7·792	7·808	7·823	7·839
·04	·529	·543	·556	·569	·583	·596	·609	·622	·635	·649	·352	7·846	7·854	7·861	7·869	7·876	7·884	7·891	7·899	7·906	7·914
·05	·662	·675	·689	·702	·715	·729	·742	·755	·769	·782	·351	7·921	7·929	7·936	7·944	7·951	7·959	7·966	7·974	7·981	7·989
·06	·795	·809	·822	·835	·848	·862	·875	·889	·903	·917	·350	7·996	8·004	8·011	8·019	8·026	8·034	8·041	8·049	8·056	8·063
·07	·931	·945	·958	·972	·986	·999	1·013	1·027	1·041	1·054	·34	8·118	8·173	8·228	8·283	8·338	8·393	8·434	8·476	8·518	8·560
·08	1·068	1·082	1·095	1·109	1·123	1·136	1·150	1·164	1·178	1·191	·33	8·602	8·644	8·678	8·713	8·747	8·782	8·816	8·851	8·885	8·920
·09	1·205	1·219	1·232	1·246	1·260	1·273	1·287	1·301	1·315	1·328	·32	8·949	8·978	9·007	9·036	9·065	9·094	9·123	9·152	9·181	9·210
·10	1·342	1·356	1·369	1·383	1·397	1·410	1·424	1·438	1·452	1·465	·31	9·235	9·261	9·286	9·312	9·337	9·363	9·388	9·414	9·439	9·465
·11	1·479	1·493	1·506	1·520	1·534	1·547	1·561	1·575	1·590	1·604	·30	9·490	9·512	9·535	9·557	9·580	9·602	9·625	9·647	9·670	9·692
·12	1·618	1·632	1·646	1·661	1·675	1·689	1·704	1·718	1·732	1·747	·29	9·715	9·737	9·759	9·779	9·800	9·820	9·841	9·861	9·882	9·902
·13	1·761	1·775	1·789	1·804	1·818	1·832	1·846	1·860	1·875	1·889	·28	9·923	9·943	9·964	9·984	10·005	10·025	10·045	10·064	10·083	10·102
·14	1·904	1·919	1·933	1·948	1·962	1·977	1·991	2·005	2·019	2·033	·27	10·121	10·139	10·157	10·175	10·193	10·211	10·229	10·247	10·265	10·283
·15	2·047	2·062	2·076	2·091	2·105	2·120	2·134	2·149	2·163	2·178	·26	10·300	10·317	10·334	10·351	10·368	10·385	10·402	10·419	10·436	10·453
·16	2·192	2·207	2·221	2·236	2·251	2·266	2·281	2·296	2·311	2·326	·25	10·473	10·490	10·507	10·524	10·541	10·558	10·575	10·591	10·607	10·623
·17	2·341	2·356	2·371	2·386	2·401	2·416	2·431	2·446	2·461	2·476	·24	10·639	10·655	10·671	10·687	10·703	10·719	10·735	10·751	10·767	10·783
·18	2·492	2·507	2·523	2·538	2·554	2·570	2·585	2·601	2·616	2·632	·23	10·799	10·815	10·831	10·847	10·862	10·877	10·892	10·907	10·922	10·937
·19	2·648	2·663	2·679	2·694	2·710	2·726	2·741	2·757	2·772	2·788	·22	10·952	10·967	10·982	10·997	11·012	11·027	11·042	11·057	11·072	11·087
·20	2·804	2·820	2·836	2·852	2·868	2·885	2·901	2·917	2·933	2·949	·21	11·102	11·117	11·132	11·147	11·162	11·177	11·191	11·205	11·219	11·233
·21	2·965	2·981	2·997	3·013	3·029	3·046	3·062	3·078	3·095	3·112	·20	11·247	11·261	11·275	11·289	11·303	11·317	11·331	11·345	11·359	11·373
·22	3·129	3·146	3·163	3·180	3·197	3·214	3·231	3·248	3·265	3·282	·19	11·387	11·401	11·415	11·429	11·443	11·456	11·470	11·483	11·497	11·510
·23	3·299	3·316	3·333	3·350	3·367	3·384	3·401	3·419	3·437	3·455	·18	11·524	11·537	11·551	11·564	11·578	11·591	11·605	11·618	11·632	11·645
·24	3·473	3·491	3·509	3·527	3·545	3·563	3·581	3·599	3·617	3·635	·17	11·659	11·672	11·685	11·698	11·711	11·724	11·737	11·750	11·763	11·776
·25	3·653	3·671	3·689	3·707	3·726	3·745	3·764	3·783	3·802	3·821	·16	11·789	11·802	11·815	11·828	11·841	11·854	11·867	11·880	11·893	11·905
·26	3·840	3·859	3·878	3·897	3·916	3·935	3·954	3·973	3·993	4·013	·15	11·918	11·930	11·943	11·955	11·968	11·980	11·993	12·005	12·018	12·030
·27	4·033	4·054	4·074	4·094	4·114	4·135	4·155	4·175	4·196	4·216	·14	12·043	12·055	12·068	12·080	12·093	12·105	12·118	12·130	12·143	12·155
·28	4·236	4·257	4·278	4·299	4·321	4·344	4·366	4·389	4·411	4·433	·13	12·168	12·180	12·192	12·205	12·218	12·231	12·243	12·255	12·269	12·279
·29	4·456	4·478	4·501	4·523	4·545	4·568	4·590	4·612	4·636	4·660	·12	12·291	12·303	12·315	12·327	12·339	12·351	12·363	12·375	12·387	12·399
·30	4·685	4·709	4·733	4·758	4·782	4·806	4·831	4·855	4·880	4·904	·11	12·411	12·423	12·435	12·447	12·459	12·471	12·483	12·495	12·507	12·519
·31	4·931	4·958	4·985	5·012	5·039	5·066	5·094	5·122	5·150	5·178	·10	12·531	12·543	12·555	12·567	12·579	12·591	12·603	12·615	12·627	12·639
·32	5·205	5·236	5·267	5·298	5·329	5·360	5·391	5·422	5·453	5·484	·09	12·650	12·662	12·673	12·685	12·696	12·708	12·719	12·731	12·743	12·755
·33	5·516	5·552	5·589	5·625	5·662	5·698	5·735	5·772	5·809	5·853	·08	12·767	12·778	12·790	12·801	12·813	12·824	12·836	12·847	12·859	12·870
·34	5·897	5·942	5·986	6·030	6·075	6·132	6·189	6·246	6·303	6·360	·07	12·882	12·893	12·905	12·916	12·928	12·939	12·951	12·962	12·974	12·986
·350	6·417	6·424	6·432	6·439	6·447	6·454	6·462	6·469	6·477	6·485	·06	12·997	13·009	13·020	13·032	13·043	13·055	13·066	13·078	13·089	13·101
·351	6·493	6·500	6·508	6·515	6·523	6·530	6·538	6·545	6·553	6·561	·05	13·112	13·124	13·135	13·147	13·158	13·170	13·181	13·193	13·204	13·216
·352	6·569	6·576	6·584	6·591	6·599	6·606	6·614	6·621	6·629	6·637	·04	13·227	13·238	13·249	13·260	13·271	13·282	13·293	13·305	13·316	13·327
·353	6·645	6·661	6·677	6·693	6·709	6·725	6·741	6·757	6·773	6·788	·03	13·338	13·349	13·361	13·372	13·383	13·394	13·405	13·417	13·428	13·439
·354	6·804	6·820	6·836	6·852	6·868	6·884	6·900	6·916	6·932	6·947	·02	13·450	13·461	13·472	13·483	13·494	13·505	13·516	13·527	13·538	13·550
·355	6·963	6·979	6·995	7·011	7·027	7·043	7·059	7·075	7·091	7·106	·01	13·561	13·572	13·584	13·595	13·606	13·618	13·629	13·640	13·652	13·663
·356	7·122	7·163	7·204	7·245	...	...	...	...	...	...	·00	13·674	13·686	13·697	13·708	13·720	13·731	13·742	13·754	13·765	13·777

g—EYE-TABLE FOR YOGAS—*continued.*

Moon's anomaly and moon's equation of the centre in days and fractions of a day.

(SŪRYA SIDDHĀNTA.)

Eqn. +	0	1	2	3	4	5	6	7	8	9	Eqn. +	9	8	7	6	5	4	3	2	1	0
	Moon's anomaly in days											Moon's anomaly in days									
·00	13·777	13·789	13·800	13·812	13·823	13·834	13·846	13·857	13·868	13·880	·356	..	..	..	..	...	...	20·310	20·351	20·392	20·432
·01	13·891	13·902	13·914	13·925	13·936	13·948	13·959	13·970	13·982	13·993	·355	20·448	20·464	20·470	20·486	20·502	20·518	20·534	20·550	20·566	20·572
·02	14·005	14·016	14·028	14·040	14·051	14·062	14·073	14·084	14·095	14·106	·354	20·607	20·623	20·639	20·655	20·671	20·687	20·703	20·719	20·735	20·751
·03	14·117	14·128	14·139	14·151	14·162	14·173	14·184	14·195	14·206	14·217	·353	20·766	20·782	20·798	20·814	20·830	20·846	20·862	20·878	20·894	20·910
·04	14·228	14·239	14·250	14·261	14·272	14·283	14·294	14·305	14·316	14·327	·352	20·918	20·927	20·935	20·944	20·952	20·960	20·969	20·977	20·986	20·994
·05	14·338	14·350	14·361	14·373	14·384	14·396	14·407	14·419	14·430	14·442	351	21·002	21·011	21·019	21·028	21·036	21·044	21·053	21·061	21·070	21·078
·06	14·453	14·465	14·476	14·488	14·499	14·511	14·522	14·534	14·545	14·557	·350	21·086	21·095	21·103	21·112	21·120	21·128	21·137	21·145	21·153	21·161
07	14·568	14·580	14·592	14·603	14·615	14·626	14·638	14·649	14·661	14·672	34	21·214	21·267	21·320	21·373	21·426	21·479	21·523	21·568	21·612	21·657
08	14·684	14·695	14·707	14·718	14·730	14·741	14·753	14·764	14·776	14·787	·33	21·701	21·745	21·782	21·819	21·856	21·892	21·929	21·965	22·002	22·038
·09	14·799	14·811	14·823	14·835	14·846	14·858	14·869	14·881	14·892	14·904	32	22·070	22·101	22·132	22·163	22·194	22·225	22·256	22·287	22·318	22·349
·10	14·915	14·927	14·939	14·951	14·963	14·975	14·987	14·999	15·011	15·023	31	22·376	22·403	22·430	22·457	22·484	22·511	22·538	22·567	22·596	22·623
·11	15·035	15·047	15·059	15·071	15·083	15·095	15·107	15·119	15·131	15·143	30	22·650	22·675	22·699	22·723	22·748	22·772	22·796	22·821	22·845	22·869
12	15·155	15·167	15·179	15·191	15·203	15·215	15·227	15·239	15·251	15·263	·29	22·894	22·918	22·942	22·955	22·978	23·001	23·024	23·047	23·070	23·093
·13	15·275	15·287	15·299	15·311	15·323	15·336	15·349	15·362	15·374	15·386	28	23·115	23·137	23·160	23·182	23·204	23·227	23·249	23·270	23·291	23·312
·14	15·389	15·411	15·424	15·436	15·449	15·461	15·474	15·486	15·499	15·511	27	23·333	23·354	23·375	23·396	23·417	23·438	23·459	23·480	23·500	23·520
·15	15·524	15·536	15·549	15·561	15·574	15·586	15·599	15·611	15·624	15·636	·26	23·541	23·561	23·581	23·600	23·619	23·638	23·657	23·676	23·695	23·714
·16	15·649	15·661	15·674	15·687	15·700	15·713	15·726	15·739	15·752	15·765	·25	23·733	23·752	23·771	23·790	23·809	23·828	23·847	23·865	23·883	23·901
·17	15·778	15·791	15·804	15·817	15·830	15·843	15·856	15·869	15·882	15·895	·24	23·919	23·937	23·955	23·973	23·991	24·009	24·027	24·045	24·063	24·081
·18	15·909	15·922	15·936	15·949	15·963	15·976	15·990	16·003	16·017	16·030	·23	24·099	24·117	24·135	24·153	24·171	24·188	24·205	24·222	24·239	24·256
·19	16·044	16·057	16·071	16·084	16·098	16·111	16·125	16·139	16·153	16·167	·22	24·273	24·290	24·307	24·324	24·341	24·358	24·375	24·392	24·409	24·426
·20	16·181	16·195	16·209	16·223	16·237	16·251	16·265	16·279	16·293	16·307	·21	24·443	24·460	24·477	24·494	24·511	24·528	24·544	24·560	24·576	24·592
·21	16·321	16·335	16·349	16·363	16·377	16·391	16·406	16·420	16·435	16·450	·20	24·608	24·624	24·640	24·656	24·671	24·688	24·702	24·718	24·734	24·750
·22	16·465	16·480	16·495	16·510	16·525	16·540	16·555	16·570	16·585	16·600	19	24·766	24·782	24·797	24·813	24·828	24·844	24·860	24·875	24·891	24·906
·23	16·615	16·630	16·645	16·660	16·676	16·691	16·707	16·723	16·739	16·755	18	24·922	24·938	24·953	24·969	24·984	25·000	25·016	25·031	25·047	25·062
·24	16·771	16·787	16·803	16·819	16·835	16·851	16·867	16·883	16·899	16·915	·17	25·078	25·093	25·108	25·123	25·138	25·153	25·168	25·183	25·198	25·213
·25	16·931	16·947	16·963	16·980	16·997	17·014	17·031	17·048	17·065	17·082	16	25·228	25·243	25·258	25·273	25·288	25·303	25·318	25·333	25·347	25·362
·26	17·099	17·116	17·133	17·150	17·167	17·183	17·200	17·217	17·235	17·253	·15	25·376	25·391	25·405	25·419	25·433	25·448	25·462	25·477	25·491	25·506
·27	17·271	17·289	17·308	17·326	17·345	17·363	17·382	17·400	17·419	17·437	14	25·520	25·534	25·548	25·562	25·576	25·591	25·605	25·620	25·635	25·650
·28	17·456	17·474	17·493	17·511	17·531	17·551	17·571	17·591	17·611	17·631	·13	25·665	25·679	25·694	25·708	25·722	25·736	25·750	25·765	25·779	25·793
·29	17·651	17·671	17·691	17·711	17·731	17·752	17·773	17·794	17·816	17·839	·12	25·807	25·821	25·836	25·850	25·865	25·879	25·893	25·908	25·922	25·936
·30	17·861	17·884	17·906	17·929	17·951	17·974	17·996	18·019	18·041	18·063	·11	25·950	25·964	25·979	25·993	26·007	26·021	26·035	26·049	26·062	26·076
·31	18·088	18·114	18·139	18·165	18·190	18·216	18·241	18·267	18·292	18·318	·10	26·090	26·103	26·117	26·131	26·145	26·158	26·172	26·186	26·199	26·213
·32	18·343	18·372	18·401	18·430	18·459	18·488	18·517	18·546	18·575	18·604	·09	26·227	26·240	26·254	26·268	26·282	26·295	26·309	26·322	26·335	26·349
·33	18·634	18·668	18·703	18·737	18·772	18·806	18·841	18·875	18·910	18·952	·08	26·363	26·376	26·390	26·404	26·418	26·431	26·445	26·459	26·472	26·486
·34	18·994	19·036	19·078	19·121	19·164	19·218	19·272	19·327	19·382	19·437	·07	26·500	26·513	26·527	26·541	26·555	26·568	26·582	26·596	26·609	26·623
·350	19·492	19·499	19·507	19·514	19·522	19·529	19·537	19·544	19·551	19·558	·06	26·637	26·651	26·665	26·679	26·692	26·706	26·719	26·732	26·745	26·759
·351	19·566	19·573	19·581	19·588	19·596	19·603	19·611	19·618	19·626	19·633	05	26·772	26·785	26·799	26·812	26·825	26·839	26·852	26·865	26·879	26·892
·352	19·640	19·647	19·655	19·662	19·670	19·677	19·685	19·692	19·700	19·707	04	26·905	26·919	26·932	26·945	26·958	26·971	26·985	26·998	27·011	27·025
·353	19·715	19·730	19·745	19·760	19·775	19·790	19·805	19·820	19·835	19·850	03	27·038	27·051	27·065	27·078	27·091	27·105	27·118	27·131	27·145	27·158
·354	19·865	19·880	19·895	19·910	19·925	19·940	19·955	19·970	19·985	20·000	·02	27·171	27·185	27·198	27·211	27·225	27·238	27·252	27·266	27·279	27·292
·355	20·017	20·034	20·051	20·068	20·085	20·102	20·119	20·136	20·153	20·170	·01	27·305	27·319	27·332	27·346	27·359	27·372	27·386	27·399	27·412	27·425
·356	20·186	20·227	20·268	20·310	...	...	...	...	...	...	·00	27·438	27·451	27·464	27·477	27·490	27·503	27·516	27·529	27·542	27·555

h—EYE-TABLE FOR TITHIS.

Sun's anomaly expressed as days of the solar year and sun's equation of the centre in fractions of a day.

(SŪRYA SIDDHĀNTA.)

Sun's anomaly in days of the solar year.

Eqn. +	9	8	7	6	5	4	3	2	1	0
·175	...	...	...	...	...	365.13	0.07	0.27	0.47	0.62
·174	0.77	0.92	1.07	1.22	1.37	1.52	1.67	1.82	1.96	2.11
·173	2.25	2.40	2.54	2.68	2.82	2.97	3.11	3.26	3.40	3.55
·172	3.69	3.84	3.98	4.13	4.28	4.39	4.51	4.63	4.75	4.87
·171	4.99	5.11	5.23	5.35	5.47	5.59	5.71	5.83	5.95	6.07
·170	6.19	6.31	6.43	6.55	6.67	6.79	6.91	7.03	7.15	7.27
·16	8.28	9.23	10.18	11.13	12.06	12.86	13.63	14.47	15.27	16.03
·15	16.76	17.44	18.15	18.86	19.57	20.19	20.82	21.45	22.07	22.70
·14	23.32	23.89	24.45	25.02	25.60	26.17	26.74	27.29	27.82	28.34
·13	28.85	29.37	29.89	30.41	30.94	31.43	31.91	32.39	32.87	33.35
·12	33.83	34.31	34.79	35.24	35.70	36.16	36.61	37.06	37.51	37.96
·11	38.41	38.84	39.27	39.69	40.13	40.55	40.98	41.40	41.83	42.25
·10	42.65	43.05	43.46	43.86	44.27	44.68	45.08	45.48	45.89	46.29
09	46.66	47.05	47.43	47.82	48.21	48.60	48.98	49.37	49.75	50.13
·08	50.49	50.86	51.23	51.60	51.97	52.34	52.71	53.08	53.45	53.82
·07	54.17	54.52	54.88	55.24	55.60	55.96	56.32	56.68	57.03	57.39
·06	57.73	58.08	58.43	58.78	59.13	59.48	59.83	60.18	60.52	60.87
·05	61.21	61.56	61.89	62.23	62.18	62.92	63.26	63.60	63.94	64.28
·04	64.60	64.94	65.28	65.61	65.95	66.29	66.62	66.95	67.28	67.61
·03	67.93	68.26	68.59	68.92	69.26	69.59	69.91	70.24	70.57	70.89
·02	71.21	71.53	71.86	72.18	72.52	72.85	73.17	73.49	73.81	74.14
·01	74.45	74.77	75.09	75.41	75.75	76.07	76.39	76.71	77.03	77.35
·00	77.66	77.98	78.30	78.62	78.95	79.27	79.59	79.91	80.23	80.55

Sun's anomaly in days of the solar year.

Eqn. −	0	1	2	3	4	5	6	7	8	9
·00	80.55	80.87	81.19	81.51	81.83	82.15	82.48	82.80	83.12	83.44
01	83.75	84.06	84.38	84.71	85.08	85.35	85.68	86.01	86.33	86.65
02	86.96	87.28	87.61	87.93	88.25	88.58	88.91	89.24	89.56	89.89
03	90.21	90.53	90.86	91.18	91.51	91.84	92.17	92.50	92.84	93.17
04	93.49	93.82	94.15	94.48	94.81	95.14	95.48	95.81	96.15	96.49
05	96.82	97.16	97.50	97.84	98.18	98.52	98.87	99.20	99.64	99.89
06	100.23	100.57	100.92	101.27	101.62	101.96	102.32	102.67	103.02	103.36
07	103.71	104.06	104.42	104.78	105.14	105.49	105.86	106.22	106.57	106.93
08	107.28	107.65	108.02	108.38	108.75	109.12	109.50	109.87	110.24	110.61
09	110.97	111.35	111.73	112.12	112.50	112.89	113.28	113.67	114.05	114.43
10	114.81	115.21	115.61	116.02	116.42	116.82	117.24	117.64	118.04	118.44
11	118.85	119.27	119.70	120.12	120.55	120.97	121.41	121.83	122.26	122.69
12	123.13	123.58	124.04	124.49	124.94	125.39	125.86	126.31	126.79	127.27
13	127.74	128.22	128.71	129.19	129.67	130.15	130.69	131.21	131.73	132.25
14	132.76	133.28	133.80	134.36	134.93	135.49	136.07	136.94	137.21	137.78
15	138.40	139.02	139.65	140.28	140.90	141.53	142.24	142.95	143.66	144.37
16	145.07	145.83	146.63	147.43	148.24	149.04	149.97	150.92	151.87	152.82
170	153.82	153.94	154.06	154.18	154.30	154.42	154.54	154.66	154.78	154.90
171	155.02	155.14	155.26	155.38	155.50	155.62	155.74	155.86	155.98	156.10
172	156.22	156.34	156.46	156.58	156.70	156.81	156.95	157.10	157.24	157.39
173	157.53	157.68	157.82	157.97	158.11	158.26	158.41	158.55	158.69	158.84
174	158.98	159.13	159.27	159.42	159.57	159.72	159.87	160.02	160.17	160.32
175	160.47	160.62	160.82	161.02	161.22	161.42	161.63	161.83	162.03	162.28
176	162.43	162.63	162.83	163.03	163.23	163.43	163.63	163.83	164.08	164.23
177	164.43	164.77	165.12	165.46	165.81	166.15	166.50	166.85	167.19	167.54
178	167.89	168.24	169.50	170.77	172.04	...	...	...	..	...

Sun's anomaly in days of the solar year

Eqn. −	9	8	7	6	5	4	3	2	1	0
·178	...	...	...	...	...	172.04	173.31	174.58	175.84	176.19
·177	176.54	176.89	177.23	177.58	177.93	178.27	178.62	178.96	179.31	179.65
·176	179.85	180.05	180.25	180.45	180.65	180.85	181.05	181.25	181.45	181.65
·175	181.85	182.05	182.25	182.45	182.64	182.84	183.04	183.24	183.44	183.59
·174	183.74	183.89	184.04	184.19	184.34	184.49	184.64	184.79	184.93	185.08
·173	185.22	185.37	185.51	185.65	185.80	185.95	186.09	186.24	186.38	186.53
·172	186.67	186.82	186.96	187.11	187.25	187.36	187.48	187.60	187.72	187.84
·171	187.96	188.08	188.20	188.32	188.44	188.56	188.68	188.80	188.92	189.04
·170	189.16	189.28	189.40	189.52	189.64	189.76	189.88	190.00	190.12	190.24
·16	191.26	192.21	193.16	194.11	195.02	195.82	196.62	197.42	198.22	198.98
·15	199.70	200.40	201.11	201.82	202.51	203.13	203.76	204.38	205.01	205.63
·14	206.26	206.83	207.40	207.96	208.52	209.09	209.66	210.21	210.73	211.15
·13	211.78	212.30	212.81	213.33	213.84	214.32	214.80	215.28	215.76	216.24
·12	216.73	217.21	217.69	218.14	218.58	219.03	219.48	219.93	220.38	220.83
11	221.30	221.73	222.15	222.57	222.99	223.41	223.83	224.25	224.68	225.10
·10	225.52	225.92	226.32	226.72	227.11	227.52	227.92	228.32	228.72	229.12
·09	229.51	229.89	230.28	230.66	231.03	231.41	231.80	232.18	232.56	232.94
·08	233.32	233.68	234.05	234.42	234.77	235.14	235.51	235.88	236.24	236.61
·07	236.97	237.33	237.68	238.04	238.38	238.74	239.09	239.45	239.80	240.16
·06	240.52	240.87	241.21	241.56	241.89	242.24	242.58	242.93	243.28	243.62
·05	243.98	244.32	244.66	244.99	245.82	245.66	245.99	246.33	246.67	247.01
·04	247.35	247.69	248.03	248.36	248.67	249.00	249.33	249.66	249.99	250.32
·03	250.66	250.99	251.32	251.65	251.96	252.29	252.61	252.93	253.26	253.58
·02	253.91	254.24	254.56	254.89	255.20	255.52	255.84	256.17	256.49	256.81
·01	257.14	257.46	257.78	258.10	258.41	258.73	259.05	259.37	259.68	260.00
·00	260.33	260.65	260.96	261.28	261.59	261.91	262.23	262.54	262.86	263.18

Sun's anomaly in days of the solar year.

Eqn. +	0	1	2	3	4	5	6	7	8	9
00	263.18	263.50	263.81	264.13	264.45	264.77	265.07	265.39	265.71	266.03
01	266.36	266.67	266.99	267.31	267.63	267.95	268.26	268.58	268.90	269.21
·02	269.55	269.87	270.19	270.51	270.83	271.96	271.47	271.79	272.12	272.44
03	272.78	273.10	273.42	273.75	274.07	274.40	274.71	275.04	275.37	275.70
04	276.04	276.37	276.70	277.02	277.35	277.68	278.00	278.33	278.67	279.00
05	279.35	279.69	280.03	280.36	280.70	281.04	281.36	281.70	282.04	282.38
06	282.74	283.08	283.43	283.77	284.12	284.46	284.80	285.14	285.49	285.84
·07	286.20	286.55	286.91	287.26	287.62	287.97	288.32	288.67	289.03	289.38
·08	289.75	290.12	290.48	290.85	291.22	291.58	291.94	292.31	292.67	293.04
09	293.42	293.79	294.18	294.53	294.94	295.33	295.70	296.08	296.46	296.85
·10	297.24	297.64	298.04	298.44	298.84	299.24	299.63	300.04	300.47	300.84
11	301.26	301.68	302.10	302.53	302.95	303.37	303.78	304.21	304.63	305.06
12	305.52	305.97	306.42	306.87	307.32	307.77	308.21	308.66	309.14	309.62
·13	310.11	310.59	311.07	311.55	312.03	312.51	313.02	313.54	314.06	314.58
14	315.11	315.63	316.15	316.70	317.27	317.84	318.39	318.96	319.53	320.09
·15	320.73	321.35	321.98	322.60	323.22	323.85	324.54	325.25	325.95	326.66
·16	327.38	328.13	328.94	329.74	330.54	331.34	332.25	333.20	334.14	335.09
·170	336.11	336.23	336.35	336.47	336.59	336.71	336.83	336.95	337.07	337.19
171	337.31	337.43	337.55	337.67	337.79	337.91	338.03	338.15	338.27	338.39
·172	338.51	338.63	338.75	338.87	338.99	339.10	339.24	339.39	339.53	339.68
·173	339.82	339.97	340.11	340.26	340.40	340.55	340.70	340.84	340.98	341.13
174	341.27	341.42	341.56	341.71	341.86	342.01	342.16	342.31	342.46	342.61
·175	342.76	342.91	343.11	343.31	343.51	343.71	343.90	344.10	344.30	344.50
176	344.70	344.90	345.10	345.30	345.50	345.70	345.90	346.10	346.30	346.50
·177	346.70	347.04	347.39	347.73	348.08	348.42	348.99	349.12	349.46	349.81
178	350.16	350.51	350.77	351.04	351.31	..	...	..		.

Eqn. −	9	8	7	6	5	4	3	2	1	0
·178	...	...	.	.		354.31	355.58	356.85	358.11	358.46
177	358.81	359.16	359.50	359.85	360.20	363.44	360.79	361.13	361.48	361.82
176	362.12	362.32	362.52	362.72	362.92	363.12	363.32	363.52	363.72	363.92
·175	364.12	364.32	364.52	364.72	364.93	365.13	.	...	..	...

i—EYE-TABLE FOR YOGAS.

Sun's anomaly expressed as days of the solar year and sun's equation of the centre in fractions of a day.

(SŪRYA SIDDHĀNTA.)

Eqn. −	9	8	7	6	5	4	3	2	1	0	Eqn. +	0	1	2	3	4	5	6	7	8	9
	Sun's anomaly in days of the solar year.											Sun's anomaly in days of the solar year.									
·151	...	...	...	..	...	..	...	...	...	0·08	·00	80·55	80·91	81·28	81·65	82·02	82·39	82·75	83·12	83·49	83·86
·150	0·32	0·56	0·79	1·00	1·21	1·42	1·63	1·84	2·05	2·26	·01	84·23	84·60	84·97	85·35	85·72	86·10	86·46	86·84	87·21	87·59
·14	3·73	5·15	6·57	7·99	9·09	10·19	11·29	12·39	13·32	14·24	·02	87·96	88·33	88·71	89·08	89·46	89·83	90·20	90·57	90·95	91·32
·13	15·16	16·08	16·95	17·82	18·68	19·54	20·25	20·96	21·67	22·38	·03	91·70	92·08	92·47	92·85	93·24	93·62	94·00	94·38	94·77	95·15
·12	23·09	23·80	24·50	25·20	25·88	26·57	27·26	27·95	28·51	29·07	·04	95·54	95·92	96·31	96·70	97·09	97·48	97·86	98·25	98·64	99·04
·11	29·63	30·19	30·75	31·31	31·86	32·42	32·98	33·54	34·10	34·66	·05	99·44	99·84	100·25	100·65	101·06	101·46	101·86	102·26	102·67	103·07
·10	35·22	35·74	36·26	36·78	37·29	37·81	38·33	38·84	39·34	39·84	·06	103·48	103·89	104·30	104·72	105·13	105·55	105·95	106·36	106·77	107·19
·09	40·33	40·82	41·31	41·80	42·28	42·77	43·24	43·71	44·18	44·65	·07	107·61	108·04	108·47	108·90	109·33	109·76	110·18	110·61	111·04	111·48
·08	45·12	45·59	46·06	46·52	46·96	47·40	47·85	48·29	48·73	49·17	·08	111·92	112·36	112·80	113·24	113·69	114·13	114·57	115·03	115·50	115·97
·07	49·61	50·05	50·48	50·92	51·33	51·76	52·19	52·62	53·05	53·48	·09	116·44	116·91	117·38	117·85	118·32	118·81	119·29	119·78	120·27	120·76
·06	53·90	54·32	54·73	55·14	55·52	55·96	56·37	56·79	57·20	57·61	·10	121·25	121·75	122·25	122·76	123·28	123·80	124·31	124·83	125·35	125·87
·05	58·02	58·42	58·83	59·23	59·63	60·03	60·41	60·84	61·25	61·65	·11	126·43	126·99	127·55	128·11	128·67	129·23	129·78	130·34	130·90	131·46
·04	62·05	62·45	62·84	63·23	63·61	64·00	64·39	64·78	65·17	65·55	·12	132·02	132·58	133·14	133·83	134·52	135·21	135·89	136·59	137·29	138·00
·03	65·94	66·32	66·71	67·09	67·47	67·85	68·24	68·62	69·01	69·39	·13	138·71	139·42	140·13	140·84	141·55	142·41	143·27	144·14	145·01	145·93
·02	69·77	70·14	70·52	70·89	71·26	71·63	72·01	72·38	72·76	73·13	·14	146·85	147·77	148·70	149·80	150·90	152·00	153·05	154·52	155·94	157·36
·01	73·50	73·88	74·25	74·63	74·99	75·37	75·74	76·12	76·49	76·86	·150	158·83	159·04	159·25	159·46	159·67	159·88	160·09	160·30	160·53	160·77
·00	77·23	77·60	77·97	78·34	78·70	79·07	79·44	79·81	80·18	80·55	·151	161·01	161·24	161·47	161·71	161·95	162·19	162·43	162·67	162·91	163·15
											·152	163·39	163·62	163·86	164·10	164·48	164·86	165·24	165·62	166·00	166·38
											·153	166·77	167·15	167·53	167·91	169·17	170·44	171·71	...	...	...

Eqn. +	9	8	7	6	5	4	3	2	1	0	Eqn. −	0	1	2	3	4	5	6	7	8	9
·153	...	..	..	171·71	172·98	174·25	175·51	175·89	176·27	176·65	·00	263·18	263·54	263·91	264·28	264·65	265·02	265·40	265·77	266·14	266·51
·152	177·04	177·42	177·80	178·18	178·56	178·94	179·32	179·56	179·80	180·03	·01	266·88	267·25	267·62	268·00	268·37	268·75	269·13	269·51	269·88	270·26
·151	180·27	180·51	180·75	180·99	181·23	181·47	181·71	181·95	182·18	182·41	·02	270·63	271·00	271·38	271·75	272·13	272·50	272·89	273·26	273·64	274·01
·150	182·65	182·89	183·12	183·33	183·54	183·75	183·96	184·17	184·38	184·59	·03	274·39	274·77	275·16	275·54	275·93	276·31	276·71	277·09	277·48	277·86
·14	186·06	187·48	188·90	190·32	191·44	192·54	193·64	194·74	195·67	196·59	·04	278·25	278·63	279·02	279·41	279·80	280·19	280·59	280·98	281·37	281·77
·13	197·51	198·43	199·30	200·17	201·05	201·91	202·62	203·33	204·04	204·75	·05	282·17	282·57	282·98	283·38	283·79	284·19	284·61	285·01	285·42	285·82
·12	205·46	206·17	206·87	207·57	208·27	208·96	209·65	210·34	210·90	211·46	·06	286·23	286·64	287·05	287·49	287·88	288·30	288·72	289·13	289·54	289·96
·11	212·02	212·58	213·14	213·70	214·27	214·83	215·39	215·95	216·51	217·07	·07	290·38	290·81	291·24	291·67	292·10	292·53	292·97	293·40	293·83	294·27
·10	217·63	218·15	218·67	219·19	219·72	220·24	220·76	221·27	221·77	222·27	·08	294·71	295·15	295·59	296·03	296·48	296·92	297·38	297·84	298·31	298·78
·09	222·76	223·25	223·74	224·23	224·73	225·22	225·69	226·16	226·63	227·10	·09	299·25	299·72	300·19	300·66	301·13	301·62	302·12	302·61	303·10	303·59
·08	227·57	228·04	228·51	228·97	229·43	229·87	230·32	230·76	231·20	231·64	·10	304·08	304·58	305·08	305·59	306·11	306·63	307·16	307·68	308·20	308·72
·07	232·08	232·52	232·95	233·38	233·82	234·25	234·78	235·21	235·64	236·07	·11	309·28	309·84	310·40	310·96	311·52	312·08	312·65	313·21	313·77	314·33
·06	236·39	236·81	237·22	237·63	238·05	238·47	238·88	239·30	239·71	240·12	·12	314·89	315·45	316·01	316·70	317·39	318·08	318·78	319·48	320·18	320·89
·05	240·53	240·93	241·34	241·74	242·16	242·56	242·97	243·37	243·78	244·18	·13	321·60	322·31	323·02	323·73	324·44	325·30	326·18	327·05	327·92	328·84
·04	244·58	244·98	245·37	245·76	246·16	246·55	246·94	247·33	247·72	248·10	·14	329·76	330·68	331·61	332·71	333·81	334·91	336·03	337·45	338·87	340·29
·03	248·49	248·87	249·26	249·64	250·04	250·42	250·81	251·19	251·58	251·96	·150	341·76	341·97	342·18	342·39	342·60	342·81	343·02	343·23	343·46	343·70
·02	252·34	252·71	253·09	253·46	253·85	254·22	254·60	254·97	255·35	255·72	·151	343·94	344·17	344·40	344·64	344·88	345·12	345·36	345·60	345·84	346·08
·01	256·09	256·47	256·84	257·22	257·60	257·98	258·35	258·73	259·10	259·47	·152	346·32	346·55	346·79	347·03	347·41	347·79	348·17	348·55	348·93	349·31
·00	259·84	260·21	260·58	260·95	261·33	261·70	262·07	262·44	262·81	263·18	·153	349·70	350·08	350·46	350·84	352·10	353·37	354·64	...	...	...

Eqn. −	9	8	7	6	5	4	3	2	1	0
·153	...	...	...	...	355·91	357·18	358·44	358·82	359·20	359·58
·152	359·97	360·35	360·73	361·11	361·49	361·87	362·25	362·49	362·73	362·96
·151	363·20	363·44	363·68	363·92	364·16	364·40	364·64	364·88	365·11	...

e—EYE-TABLE FOR TITHIS.

Moon's anomaly and equation of the centre expressed in days and fractions of a day.

(ĀRYA SIDDHĀNTA.)

Eqn.	0	1	2	3	4	5	6	7	8	9	Eqn.	9	8	7	6	5	4	3	2	1	0
—	Moon's anomaly in days.										—	Moon's anomaly in days.									
·00	0·000	0·011	0·023	0·035	0·046	0·058	0·070	0·081	0·092	0·104	·411	...	...	7·301	7·330	7·359	7·387	7·416	7·445	7·474	7·503
·01	0·116	0·127	0·139	0·151	0·162	0·174	0·186	0·197	0·209	0·221	·410	7·531	7·559	7·587	7·598	7·609	7·620	7·631	7·643	7·654	7·666
·02	0·232	0·244	0·256	0·267	0·279	0·291	0·303	0·315	0·327	0·339	·409	7·677	7·689	7·700	7·712	7·723	7·734	7·745	7·757	7·769	7·780
·03	0·350	0·362	0·374	0·385	0·397	0·409	0·420	0·432	0·444	0·456	·408	7·792	7·803	7·815	7·826	7·838	7·848	7·860	7·871	7·878	7·884
·04	0·468	0·479	0·491	0·503	0·514	0·526	0·538	0·549	0·561	0·573	·407	7·891	7·897	7·904	7·910	7·917	7·922	7·929	7·935	7·942	7·948
·05	0·584	0·596	0·608	0·619	0·631	0·642	0·654	0·666	0·678	0·689	·406	7·955	7·961	7·968	7·975	7·981	7·987	7·993	8·000	8·006	8·012
·06	0·701	0·713	0·725	0·736	0·748	0·760	0·772	0·783	0·795	0·807	·405	8·019	8·025	8·032	8·038	8·045	8·050	8·057	8·063	8·070	8·076
·07	0·819	0·830	0·842	0·854	0·866	0·878	0·890	0·902	0·914	0·926	·404	8·083	8·090	8·097	8·103	8·110	8·115	8·121	8·128	8·135	8·141
·08	0·938	0·950	0·962	0·973	0·985	0·997	1·009	1·021	1·033	1·045	·403	8·148	8·154	8·160	8·165	8·171	8·175	8·181	8·186	8·192	8·197
·09	1·057	1·069	1·081	1·093	1·105	1·117	1·129	1·141	1·153	1·165	·402	8·203	8·208	8·214	8·219	8·225	8·229	8·235	8·240	8·246	8·251
·10	1·177	1·189	1·201	1·213	1·225	1·237	1·249	1·261	1·273	1·285	·401	8·257	8·262	8·267	8·272	8·277	8·281	8·286	8·291	8·296	8·301
·11	1·297	1·309	1·322	1·334	1·346	1·358	1·370	1·382	1·395	1·407	·400	8·306	8·311	8·316	8·321	8·326	8·330	8·335	8·340	8·344	8·349
·12	1·419	1·431	1·443	1·455	1·467	1·479	1·491	1·503	1·515	1·527	·39	8·385	8·421	8·457	8·493	8·529	8·565	8·601	8·637	8·672	8·708
·13	1·549	1·552	1·565	1·578	1·590	1·603	1·615	1·628	1·640	1·653	·38	8·737	8·768	8·799	8·828	8·857	8·886	8·915	8·944	8·972	9·000
·14	1·665	1·678	1·690	1·703	1·715	1·728	1·740	1·753	1·765	1·778	·37	9·025	9·050	9·075	9·100	9·125	9·150	9·175	9·200	9·225	9·250
·15	1·790	1·803	1·815	1·827	1·839	1·851	1·863	1·876	1·889	1·901	·36	9·274	9·296	9·318	9·339	9·360	9·381	9·402	9·423	9·444	9·465
·16	1·914	1·926	1·939	1·952	1·964	1·977	1·989	2·002	2·015	2·027	·35	9·486	9·507	9·528	9·549	9·569	9·589	9·609	9·628	9·647	9·666
·17	2·040	2·052	2·065	2·578	2·090	2·103	2·115	2·128	2·141	2·154	·34	9·685	9·704	9·723	9·742	9·761	9·780	9·799	9·818	9·836	9·854
·18	2·167	2·180	2·193	2·206	2·219	2·232	2·245	2·258	2·271	2·284	·33	9·871	9·888	9·905	9·922	9·939	9·956	9·973	9·990	10·007	10·024
·19	2·297	2·310	2·323	2·336	2·349	2·362	2·375	2·388	2·401	2·414	·32	10·041	10·058	10·075	10·092	10·108	10·123	10·139	10·155	10·170	10·186
·20	2·427	2·440	2·453	2·466	2·479	2·493	2·507	2·521	2·534	2·548	·31	10·202	10·217	10·233	10·249	10·264	10·280	10·296	10·311	10·327	10·343
·21	2·561	2·575	2·588	2·602	2·615	2·629	2·642	2·656	2·669	2·683	·30	10·358	10·373	10·388	10·403	10·418	10·433	10·448	10·462	10·477	10·491
·22	2·696	2·710	2·723	2·737	2·750	2·764	2·777	2·791	2·804	2·818	·29	10·505	10·519	10·534	10·548	10·563	10·577	10·592	10·606	10·621	10·635
·23	2·832	2·846	2·860	2·874	2·888	2·902	2·916	2·930	2·944	2·958	·28	10·649	10·663	10·677	10·691	10·705	10·719	10·732	10·746	10·759	10·773
·24	2·972	2·986	3·000	3·014	3·028	3·042	3·056	3·071	3·086	3·100	·27	10·787	10·800	10·814	10·827	10·841	10·854	10·868	10·881	10·894	10·907
·25	3·115	3·130	3·144	3·159	3·173	3·188	3·202	3·217	3·231	2·246	·26	10·920	10·932	10·945	10·958	10·971	10·984	10·997	11·010	11·023	11·036
·26	3·261	3·276	3·291	3·306	3·321	3·336	3·351	3·366	3·381	3·395	·25	11·049	11·062	11·074	11·087	11·099	11·112	11·124	11·137	11·149	11·162
·27	3·410	3·425	3·441	3·456	3·472	3·487	3·503	3·518	3·534	3·549	·24	11·175	11·187	11·200	11·213	11·225	11·237	11·249	11·261	11·273	11·285
·28	3·565	3·580	3·595	3·611	3·626	3·642	3·658	3·674	3·690	3·706	·23	11·297	11·309	11·321	11·333	11·345	11·357	11·369	11·381	11·393	11·405
·29	3·722	3·738	3·755	3·771	3·788	3·804	3·821	3·837	3·854	3·870	·22	11·417	11·429	11·440	11·452	11·463	11·475	11·486	11·498	11·509	11·521
·30	3·886	3·902	3·919	3·935	3·952	3·969	3·986	4·003	4·020	4·037	·21	11·532	11·544	11·555	11·567	11·578	11·591	11·601	11·613	11·624	11·636
·31	4·054	4·072	4·090	4·107	4·125	4·143	4·160	4·178	4·196	4·213	·20	11·647	11·659	11·670	11·682	11·694	11·706	11·717	11·728	11·739	11·750
·32	4·231	4·249	4·266	4·284	4·302	4·319	4·337	4·356	4·375	4·394	·19	11·761	11·772	11·783	11·794	11·805	11·816	11·827	11·838	11·849	11·860
·33	4·413	4·432	4·451	4·470	4·489	4·508	4·527	4·546	4·565	4·584	·18	11·871	11·882	11·893	11·904	11·915	11·926	11·937	11·948	11·959	11·970
·34	4·603	4·623	4·643	4·664	4·685	4·706	4·727	4·748	4·769	4·790	·17	11·981	11·992	12·003	12·014	12·024	12·035	12·045	12·056	12·067	12·077
·35	4·811	4·832	4·853	4·874	4·896	4·918	4·940	4·963	4·986	5·009	·16	12·088	12·098	12·109	12·120	12·130	12·141	12·151	12·162	12·173	12·183
·36	5·032	5·055	5·078	5·101	5·124	5·147	5·170	5·193	5·217	5·241	·15	12·194	12·204	12·215	12·226	12·236	12·246	12·256	12·266	12·276	12·287
·37	5·268	5·295	5·322	5·349	5·376	5·403	5·430	5·457	5·484	5·511	·14	12·297	12·308	12·318	12·329	12·339	12·350	12·360	12·371	12·381	12·392
·38	5·537	5·568	5·599	5·630	5·661	5·692	5·723	5·754	5·785	5·816	·13	12·402	12·413	12·423	12·434	12·444	12·455	12·465	12·476	12·487	12·498
·39	5·847	5·885	5·923	5·961	5·999	6·037	6·075	6·113	6·151	6·189	·12	12·508	12·518	12·528	12·538	12·548	12·558	12·568	12·578	12·588	12·598
·400	6·277	6·232	6·237	6·242	6·247	6·253	6·258	6·263	6·268	6·273	·11	12·608	12·618	12·629	12·639	12·649	12·659	12·669	12·679	12·690	12·700
·401	6·278	6·283	6·288	6·293	6·298	6·304	6·309	6·314	6·319	6·324	·10	12·710	12·720	12·730	12·740	12·750	12·760	12·770	12·780	12·790	12·800
·402	6·330	6·335	6·341	6·346	6·352	6·358	6·364	6·369	6·375	6·380	·09	12·810	12·820	12·830	12·840	12·850	12·860	12·870	12·880	12·890	12·900
·403	6·386	6·391	6·397	6·402	6·408	6·414	6·420	6·425	6·431	6·437	·08	12·910	12·920	12·950	12·940	12·950	12·960	12·970	12·979	12·989	12·999
·404	6·444	6·450	6·457	6·464	6·470	6·477	6·484	6·490	6·497	6·504	·07	13·009	13·019	13·029	13·039	13·049	13·059	13·069	13·079	13·089	13·098
·405	6·511	6·517	6·524	6·530	6·537	6·544	6·551	6·557	6·564	6·570	·06	13·108	13·118	13·127	13·137	13·147	13·157	13·166	13·176	13·186	13·196
·406	6·577	6·583	6·589	6·596	6·602	6·610	6·616	6·623	6·630	6·636	·05	13·205	13·215	13·225	13·235	13·245	13·254	13·264	13·273	13·283	13·293
·407	6·643	6·649	6·656	6·662	6·669	6·676	6·683	6·689	6·696	6·702	·04	13·302	13·312	13·322	13·331	13·341	13·351	13·360	13·370	13·380	13·389
·408	6·709	6·715	6·722	6·783	6·745	6·757	6·769	6·780	6·792	6·803	·03	13·399	13·409	13·419	13·429	13·438	13·448	13·458	13·467	13·477	13·487
·409	6·815	6·826	6·838	6·850	6·861	6·874	6·885	6·897	6·908	6·920	·02	13·496	13·506	13·516	13·525	13·535	13·545	13·555	13·565	13·575	13·585
·410	6·931	6·943	6·954	6·966	6·977	6·990	7·001	7·013	7·041	7·069	·01	13·594	13·604	13·614	13·623	13·633	13·643	13·652	13·662	13·672	13·681
·411	7·097	7·126	7·155	7·184	7·213	7·243	7·272	7·301	...	...	·00	13·691	13·701	13·710	13·719	13·729	13·739	13·748	13·758	13·768	13·777

e—EYE-TABLE FOR TITHIS—*continued.*

Moon's anomaly and equation of the centre expressed in days and fractions of a day.

(ĀRYA SIDDHĀNTA.)

Eqn. +	0	1	2	3	4	5	6	7	8	9	Eqn. +	9	8	7	6	5	4	3	2	1	0
	Moon's anomaly in days											Moon's anomaly in days									
·00	13·777	13·786	13·796	13·806	13·815	13·825	13·835	13·844	13·853	13·863	·411	...	...	20·254	20·283	20·312	20·342	20·371	20·400	20·429	20·458
·01	13·873	13·882	13·892	13·902	13·911	13·921	13·931	13·940	13·950	13·960	·410	20·486	20·514	20·542	20·553	20·564	20·577	20·588	20·600	20·611	20·623
·02	13·969	13·979	13·989	13·998	14·008	14·018	14·028	14·038	14·048	14·058	·409	20·634	20·646	20·657	20·669	20·680	20·693	20·704	20·716	20·728	20·739
·03	14·067	14·077	14·087	14·096	14·106	14·116	14·125	14·135	14·145	14·155	·408	20·751	20·762	20·774	20·785	20·797	20·809	20·821	20·832	20·839	20·845
·04	14·165	14·174	14·184	14·194	14·203	14·213	14·223	14·232	14·242	14·252	·407	20·852	20·858	20·865	20·871	20·878	20·885	20·892	20·898	20·905	20·911
·05	14·261	14·271	14·281	14·290	14·300	14·309	14·319	14·329	14·339	14·348	·406	20·918	20·924	20·931	20·938	20·944	20·952	20·958	20·965	20·971	20·977
·06	14·358	14·368	14·378	14·387	14·397	14·407	14·417	14·426	14·436	14·44[illegible]	·405	20·984	20·990	20·997	21·003	21·010	21·017	21·024	21·030	21·037	21·043
·07	14·456	14·465	14·475	14·485	14·495	14·505	14·515	14·525	14·535	14·545	·404	21·050	21·057	21·064	21·070	21·077	21·084	21·090	21·097	21·104	21·110
·08	14·555	14·565	14·575	14·584	14·594	14·604	14·614	14·624	14·634	14·644	·403	21·117	21·123	21·129	21·134	21·140	21·146	21·152	21·157	21·163	21·168
·09	14·654	14·664	14·674	14·684	14·694	14·704	14·714	14·724	14·734	14·744	·402	21·173	21·178	21·184	21·189	21·195	21·201	21·207	21·212	21·218	21·223
·10	14·754	14·764	14·774	14·784	14·794	14·804	14·814	14·824	14·834	14·844	·401	21·229	21·234	21·239	21·244	21·249	21·255	21·260	21·265	21·270	21·275
·11	14·854	14·864	14·875	14·885	14·895	14·905	14·915	14·925	14·936	14·946	·400	21·280	21·285	21·290	21·295	21·300	21·306	21·311	21·316	21·321	21·326
·12	14·956	14·966	14·976	14·986	14·996	15·006	15·016	15·026	15·036	15·046	·39	21·364	21·402	21·440	21·478	21·516	21·554	21·592	21·630	21·668	21·707
·13	15·056	15·067	15·078	15·089	15·099	15·110	15·120	15·131	15·141	15·152	·38	21·738	21·770	21·803	21·834	21·865	21·896	21·927	21·958	21·988	22·018
·14	15·162	15·173	15·183	15·194	15·204	15·215	15·225	15·236	15·246	15·257	·37	22·044	22·070	22·097	22·124	22·151	22·178	22·207	22·234	22·261	22·287
·15	15·267	15·278	15·288	15·298	15·308	15·318	15·323	15·339	15·350	15·360	·36	22·313	22·337	22·361	22·384	22·407	22·430	22·453	22·476	22·499	22·522
·16	15·371	15·381	15·392	15·403	15·413	15·424	15·434	15·445	15·456	15·466	·35	22·545	22·568	22·591	22·614	22·636	22·658	22·680	22·701	22·722	22·743
·17	15·477	15·487	15·498	15·509	15·519	15·530	15·540	15·551	15·562	15·573	·34	22·764	22·785	22·806	22·827	22·848	22·869	22·890	22·911	22·931	22·951
·18	15·584	15·595	15·606	15·617	15·628	15·639	15·650	15·661	15·672	15·683	·33	22·970	22·989	23·008	23·027	23·046	23·065	23·084	23·103	23·122	23·141
·19	15·694	15·705	15·716	15·727	15·738	15·749	15·760	15·771	15·782	15·793	·32	23·160	23·179	23·198	23·217	23·235	23·252	23·270	23·288	23·805	23·827
·20	15·804	15·815	15·826	15·837	15·848	15·860	15·872	15·884	15·895	15·907	·31	23·341	23·358	23·376	23·394	23·411	23·429	23·447	25·464	23·482	23·500
·21	15·918	15·930	15·941	15·953	15·964	15·976	15·987	15·999	16·010	16·022	·30	23·517	23·534	23·551	23·568	23·585	23·602	23·619	23·635	23·652	23·668
·22	16·033	16·045	16·056	16·068	16·079	16·091	16·102	16·114	16·125	16·137	·29	23·684	23·700	23·717	23·733	23·750	23·766	23·783	23·799	23·816	23·832
·23	16·149	16·161	16·173	16·185	16·197	16·209	16·221	16·233	16·245	16·257	·28	23·848	23·864	23·880	23·896	23·912	23·928	23·944	23·960	23·975	28·990
·24	16·269	16·281	16·293	16·305	16·317	16·329	16·341	16·354	16·367	16·379	·27	24·006	24·021	24·037	24·052	24·068	24·083	24·099	24·114	24·129	24·144
·25	16·392	16·405	16·417	16·430	16·442	16·455	16·467	16·480	16·492	16·505	·26	24·159	24·173	24·188	24·203	24·218	24·233	24·248	24·263	24·278	24·298
·26	16·518	16·531	16·544	16·557	16·570	16·583	16·596	16·609	16·622	16·634	·25	24·308	24·323	24·338	24·353	24·367	24·382	24·396	24·411	24·425	24·440
·27	16·647	16·660	16·674	16·687	16·701	16·714	16·728	16·741	16·755	16·768	·24	24·454	24·468	24·483	24·498	24·512	24·526	24·540	24·554	24·568	24·582
·28	16·782	16·795	16·808	16·822	16·836	16·850	16·864	16·878	16·892	16·906	·23	24·596	24·610	24·624	24·638	24·652	24·666	24·680	24·694	24·708	24·722
·29	16·920	16·934	16·949	16·963	16·978	16·992	17·007	17·021	17·036	17·050	·22	24·736	24·750	24·763	24·777	24·790	24·804	24·817	24·831	24·844	24·858
·30	17·064	17·078	17·093	17·107	17·122	17·137	17·152	17·167	17·182	17·197	·21	24·871	24·885	24·898	24·912	24·925	24·939	24·952	24·966	24·979	24·993
·31	17·212	17·228	17·244	17·259	17·275	17·291	17·306	17·322	17·338	17·353	·20	25·006	25·020	25·033	25·047	25·061	25·075	25·088	25·101	25·114	25·127
·32	17·369	17·385	17·400	17·416	17·432	17·447	17·463	17·480	17·497	17·514	·19	25·140	25·153	25·166	25·179	25·192	25·205	25·218	25·231	25·244	25·257
·33	17·531	17·548	17·565	17·582	17·599	17·616	17·633	17·650	17·667	17·684	·18	25·270	25·283	25·296	25·309	25·322	25·335	25·348	25·361	25·374	25·387
·34	17·701	17·719	17·737	17·756	17·775	17·794	17·813	17·832	17·851	17·870	·17	25·400	25·413	25·426	25·439	25·451	25·464	25·476	25·489	25·502	25·514
·35	17·889	17·908	17·927	17·946	17·966	17·986	18·006	18·027	18·048	18·069	·16	25·527	25·539	25·552	25·565	25·577	25·590	25·602	25·615	25·628	25·640
·36	18·090	18·111	18·132	18·153	18·174	18·195	18·216	18·237	18·259	18·281	·15	25·653	25·665	25·678	25·691	25·703	25·715	25·727	25·739	25·751	25·764
·37	18·306	18·331	18·356	18·381	18·406	18·431	18·456	18·481	18·506	18·530	·14	25·776	25·789	25·801	25·814	25·826	25·839	25·851	25·864	25·876	25·889
·38	18·554	18·582	18·610	18·639	18·668	18·697	18·726	18·755	18·786	18·817	·13	25·901	25·914	25·926	25·939	25·951	25·964	25·976	25·989	26·002	26·015
·39	18·845	18·881	18·917	18·953	18·989	19·025	19·061	19·097	19·134	19·170	·12	26·027	26·039	26·051	26·063	26·075	26·087	26·099	26·111	26·123	26·135
·400	19·206	19·211	19·216	19·221	19·226	19·230	19·235	19·240	19·245	19·250	·11	26·147	26·159	26·171	26·183	26·196	26·208	26·220	26·232	26·245	26·257
·401	19·255	19·260	19·265	19·270	19·275	19·279	19·284	19·289	19·294	19·299	·10	26·269	26·281	26·293	26·305	26·317	26·329	26·341	26·353	26·365	26·377
·402	19·305	19·310	19·316	19·321	19·327	19·331	19·337	19·342	19·348	19·353	·09	26·389	26·401	26·413	26·425	26·437	26·449	26·461	26·473	26·485	26·497
·403	19·358	19·363	19·369	19·374	19·380	19·384	19·390	19·395	19·401	19·407	·08	26·509	26·521	26·533	26·545	26·557	26·569	26·581	26·592	26·604	26·616
·404	19·414	19·420	19·427	19·434	19·440	19·445	19·452	19·458	19·465	19·472	·07	26·628	26·640	26·652	26·664	26·676	26·688	26·700	26·712	26·724	26·735
·405	19·479	19·485	19·492	19·498	19·505	19·510	19·517	19·523	19·530	19·536	·06	26·747	26·759	26·771	26·782	26·794	26·806	26·818	26·829	26·841	26·853
·406	19·543	19·549	19·555	19·562	19·568	19·574	19·580	19·587	19·594	19·600	·05	26·865	26·876	26·888	26·900	26·912	26·923	26·935	26·946	26·958	26·970
·407	19·607	19·618	19·620	19·626	19·633	19·638	19·645	19·651	19·658	19·664	·04	26·981	26·993	27·005	27·016	27·028	27·040	27·051	27·063	27·075	27·086
·408	19·671	19·677	19·684	19·695	19·707	19·717	19·729	19·740	19·752	19·763	·03	27·098	27·110	27·122	27·134	27·145	27·157	27·169	27·180	27·192	27·204
·409	19·775	19·786	19·798	19·810	19·821	19·832	19·843	19·855	19·866	19·878	·02	27·215	27·227	27·239	27·251	27·263	27·275	27·287	27·298	27·310	27·322
·410	19·889	19·901	19·912	19·924	19·935	19·946	19·957	19·968	19·996	20·024	·01	27·333	27·345	27·357	27·368	27·380	27·392	27·403	27·415	27·427	27·438
·411	20·052	20·081	20·110	20·139	20·168	20·196	20·225	20·254	...	...	·00	27·450	27·462	27·473	27·484	27·496	27·508	27·519	27·531	27·543	27·555

f—EYE-TABLE FOR NAKSHATRAS.

Moon's anomaly and moon's equation of the centre in days and fractions of a day.

(ĀRYA SIDDHĀNTA.)

Eqn.	0	1	2	3	4	5	6	7	8	9	Eqn.	9	8	7	6	5	4	3	2	1	0
—				Moon's anomaly in days.							—					Moon's anomaly in days.					
·00	0·000	0·012	0·024	0·036	0·049	0·061	0·074	0·086	0·099	0·111	·380	7·271	7·304	7·343	7·360	7·401	7·429	7·472	7·500	7·528	7·551
·01	0·124	0·136	0·149	0·161	0·174	0·186	0·199	0·211	0·224	0·236	379	7·563	7·576	7·589	7·602	7·614	7·625	7·638	7·651	7·664	7·677
·02	0·249	0·261	0·274	0·287	0·299	0·312	0·325	0·337	0·350	0·363	·378	7·689	7·701	7·713	7·725	7·738	7·750	7·763	7·776	7·789	7·801
·03	0·376	0·389	0·401	0·414	0·427	0·439	0·452	0·464	0·477	0·489	·377	7·815	7·830	7·839	7·846	7·853	7·859	7·866	7·874	7·881	7·888
·04	0·502	0·514	0·527	0·539	0·552	0·564	0·577	0·589	0·602	0·614	·376	7·896	7·903	7·910	7·917	7·924	7·930	7·937	7·944	7·951	7·958
·05	0·627	0·639	0·652	0·664	0·677	0·689	0·702	0·714	0·727	0·739	·375	7·965	7·972	7·979	7·986	7·992	7·998	8·005	8·012	8·019	8·026
·06	0·752	0·764	0·777	0·789	0·802	0·815	0·828	0·841	0·854	0·867	·374	8·033	8·041	8·049	8·057	8·064	8·070	8·077	8·084	8·091	8·098
·07	0·880	0·893	0·905	0·917	0·930	0·943	0·956	0·969	0·982	0·995	373	8·105	8·112	8·118	8·124	8·130	8·135	8·141	8·147	8·153	8·159
·08	1·008	1·020	1·033	1·046	1·059	1·072	1·085	1·098	1·111	1·124	·372	8·165	8·171	8·177	8·183	8·188	8·194	8·199	8·205	8·212	8·217
·09	1·137	1·150	1·162	1·175	1·188	1·201	1·214	1·227	1·240	1·253	371	8·223	8·229	8·235	8·240	8·245	8·250	8·256	8·261	8·266	8·271
·10	[illegible]	1·279	1·292	1·305	1·318	1·331	1·344	1·357	1·370	1·383	·370	8·277	8·282	8·288	8·294	8·300	8·305	8·310	8·315	8·320	8·324
·11	[illegible]	1·409	1·422	1·435	1·448	1·461	1·474	1·487	1·500	1.513	·36	8·363	8·402	8·441	8·479	8·517	8·555	8·593	8·631	8·669	8·707
·12	1·527	1·540	1·553	1·566	1·580	1·593	1·606	1·619	1·633	1·646	·35	8·737	8·768	8·799	8·830	8·861	8·891	8·922	8·952	8·983	9·013
·13	[illegible]	1·673	1·687	1·700	1·714	1·727	1·741	1·754	1·768	1·781	34	9·030	9·066	9·093	9·120	9·146	9·173	9·200	9·226	9·253	9·280
·14	[illegible]	1·808	1·821	1·835	1·848	1·861	1·875	1·888	1·901	1·914	·33	9·303	9·326	9·349	9·372	9·395	9·418	9·441	9·464	9·486	9·508
·15	[illegible]	1·942	1·955	1·969	1·982	1·996	2·009	2·022	2·036	2·050	32	9·529	9·550	9·571	9·592	9·613	9·634	9·655	9·676	9·697	9·718
·16	2·064	2·078	2·092	2·105	2·119	2·133	2·146	2·160	2·174	2·187	31	9·739	9·758	9·777	9·796	9·815	9·834	9·854	9·873	9·893	9·912
·17	2·201	2·215	2·229	2·243	2·257	2·271	2·285	2·299	2·313	2·327	30	9·929	9·947	9·965	9·984	10·002	10·021	10·039	10·058	10·076	10·095
·18	2·341	2·355	2·369	2·383	2·397	2·411	2·425	2·439	2·454	2·468	29	10·113	10·130	10·147	10·164	10·181	10·198	10·215	10·232	10·249	10·266
·19	2·483	2·497	2·512	2·526	2·541	2·555	2·570	2·584	2·599	2·614	·28	10·283	10·299	10·306	10·322	10·339	10·355	10·372	10·388	10·405	10·431
·20	2·629	2·643	2·658	2·672	2·687	2·701	2·716	2·730	2·744	2·759	·27	10·447	10·462	10·478	10·494	10·509	10·525	10·541	10·556	10·572	10·588
·21	2·774	2·789	2·804	2·819	2·834	2·848	2·863	2·878	2·893	2·907	·26	10·603	10·618	10·633	10·648	10·663	10·678	10·693	10·708	10·723	10·738
·22	2·922	2·937	2·953	2·968	2·984	2·999	3·015	3·030	3·046	3·061	·25	10·753	10·768	10·783	10·797	10·812	10·826	10·841	10·855	10·870	10·884
·23	3·076	3·092	3·108	3·123	3·139	3·155	3·170	3·186	3·202	3·217	·24	10·898	10·912	10·926	10·940	10·954	10·968	10·982	10·996	11·010	11·024
·24	3·233	3·249	3·265	3·281	3·297	3·313	3·329	3·345	3·361	3·377	23	11·038	11·051	11·065	11·079	11·092	11·106	11·120	11·133	11·147	11·161
·25	3·393	3·409	3·426	3·442	3·459	3·475	3·492	3·508	3·525	3·542	·22	11·174	11·187	11·201	11·214	11·228	11·241	11·255	11·268	11·282	11·295
·26	3·559	3·576	3·593	3·610	3·627	3·644	3·661	3·678	3·695	3·712	·21	11·308	11·320	11·333	11·346	11·359	11·371	11·384	11·397	11·410	11·423
·27	3·729	3·747	3·765	3·782	3·800	3·818	3·835	3·853	3·871	3·888	20	11·436	11·449	11·461	11·473	11·486	11·498	11·511	11·523	11·536	11·548
·28	3·906	3·924	3·943	3·961	3·980	3·998	4·017	4·035	4·054	4·072	19	11·561	11·574	11·587	11·599	11·612	11·624	11·637	11·649	11·662	11·674
·29	4·091	4·110	4·129	4·148	4·167	4·186	4·205	4·224	4·243	4·262	18	11·687	11·699	11·712	11·724	11·736	11·748	11·760	11·772	11·784	11·796
·30	4·282	4·303	4·328	4·344	4·364	4·385	4·405	4·426	4·446	4·466	·17	11·808	11·820	11·832	11·844	11·856	11·868	11·880	11·892	11·904	11·916
·31	4·486	4·506	4·528	4·549	4·571	4·592	4·613	4·634	4·655	4·676	16	11·928	11·939	11·951	11·963	11·974	11·986	11·998	12·009	12·021	12·033
·32	4·699	4·722	4·745	4·768	4·791	4·814	4·837	4·860	4·883	4·906	15	12·045	12·057	12·069	12·080	12·091	12·103	12·114	12·126	12·137	12·149
33	4·929	4·953	4·977	5·002	5·027	5·052	5·077	5·102	5·126	5·152	·14	12·161	12·172	12·183	12·194	12·206	12·217	12·228	12·240	12·251	12·262
·34	5·177	5·206	5·235	5·263	5·292	5·321	5·349	5·378	5·407	5·436	13	12·274	12·285	12·297	12·308	12·320	12·331	12·343	12·354	12·366	12·377
·35	5·464	5·496	5·529	5·561	5·594	5·626	5·659	5·692	5·725	5·750	·12	12·389	12·400	12·412	12·423	12·434	12·445	12·457	12·468	12·479	12·490
·36	5·790	5·830	5·870	5·910	5·950	5·990	6·030	6·070	6·111	6·152	11	12·502	12·513	12·524	12·535	12·546	12·557	12·568	12·579	12·590	12·601
·370	6·193	6·197	6·202	6·207	6·212	6·219	6·225	6·231	6·237	6·242	·10	12·612	12·623	12·634	12·645	12·656	12·667	12·678	12·689	12·700	12·711
·371	6·248	6·253	6·258	6·263	6·269	6·276	6·281	6·286	6·292	6·298	·09	12·722	12·733	12·744	12·755	12·766	12·777	12·788	12·799	12·809	12·820
·372	6·304	6·309	6·316	6·322	6·328	6·334	6·340	6·346	6·352	6·358	08	12·831	12·842	12·853	12·864	12·875	12·886	12·897	12·908	12·919	12·929
·373	6·364	6·370	6·376	6·382	6·388	6·395	6·401	6·407	6·413	6·420	·07	12·940	12·951	12·962	12·973	12·984	12·995	13·006	13·016	13·026	13·037
·374	6·427	6·434	6·441	6·448	6·455	6·463	6·470	6·478	6·486	6·494	·06	13·048	13·059	13·070	13·081	13·092	13·103	13·114	13·124	13·135	13·145
·375	6·501	6·508	6·515	6·522	6·529	6·537	6·543	6·550	6·557	6·564	05	13·156	13·166	13·177	13·187	13·198	13·208	13·219	13·229	13·240	13·250
·376	6·571	6·578	6·585	6·592	6·599	6·607	6·614	6·621	6·628	6·635	04	13·261	13·271	13·282	13·292	13·303	13·313	13·324	13·334	13·345	13·355
·377	6·643	6·650	6·657	6·665	6·672	6·680	6·686	6·694	6·703	6·718	03	13·366	13·376	13·387	13·397	13·408	13·418	13·429	13·440	13·450	13·461
·378	6·732	6·744	6·757	6·770	6·783	6·797	6·810	6·822	6·834	6·846	·02	13·472	13·483	13·494	13·504	13·515	13·526	13·536	13·547	13·558	13·568
·379	6·858	6·871	6·884	6·897	6·910	6·923	6·935	6·948	6·961	6·974	·01	13·579	13·589	13·600	13·610	13·621	13·631	13·642	13·652	13·663	13·673
·380	6·986	7·010	7·038	7·066	7·109	7·139	7·180	7·197	7·236	7·269	·00	13·684	13·694	13·705	13·715	13·726	13·736	13·747	13·757	13·767	13·777

f—EYE-TABLE FOR NAKSHATRAS—*continued.*

Moon's anomaly and moon's equation of the centre in days and fractions of a day.

(ĀRYA SIDDHĀNTA.)

Eqn. +	0	1	2	3	4	5	6	7	8	9
	Moon's anomaly in days									
·00										
·01	...	13·891	13·902	13·912	13·923	13·933	13·944	13·954	13·965	13·975
·02	13·986	13·996	14·007	14·018	14·028	14·039	14·050	14·060	14·071	14·082
·03	14·093	14·104	14·114	14·125	14·136	14·146	14·157	14·167	14·178	14·188
·04	14·199	14·209	14·220	14·230	14·241	14·251	14·262	14·272	14·283	14·293
·05	14·304	14·314	14·327	14·335	14·346	14·356	14·367	14·377	14·388	14·398
·06	14·409	14·419	14·430	14·440	14·451	14·462	14·473	14·484	14·495	14·506
·07	14·517	14·528	14·538	14·548	14·559	14·570	14·581	14·592	14·603	14·614
·08	14·625	14·635	14·646	14·657	14·668	14·679	14·690	14·701	14·712	14·723
·09	14·734	14·745	14·755	14·766	14·777	14·788	14·799	14·810	14·821	14·832
·10	14·843	14·854	14·865	14·876	14·887	14·898	14·909	14·920	14·931	14·942
·11	14·953	14·964	14·975	14·986	14·997	15·008	15·019	15·030	15·041	15·052
·12	15·064	15·075	15·086	15·097	15·109	15·120	15·131	15·142	15·154	15·165
·13	15·177	15·188	15·200	15·211	15·223	15·234	15·246	15·257	15·269	15·280
·14	15·292	15·303	15·314	15·326	15·337	15·348	15·360	15·371	15·382	15·393
·15	15·405	15·417	15·428	15·440	15·451	15·463	15·474	15·485	15·497	15·509
·16	15·521	15·533	15·545	15·556	15·568	15·580	15·591	15·603	15·615	15·626
·17	15·638	15·650	15·662	15·674	15·686	15·698	15·710	15·722	15·734	15·746
·18	15·758	15·770	15·782	15·794	15·806	15·818	15·830	15·842	15·855	15·867
·19	15·880	15·892	15·905	15·917	15·930	15·942	15·955	15·967	15·980	15·993
·20	16·006	16·018	16·031	16·043	16·056	16·068	16·081	16·093	16·105	16·118
·21	16·131	16·144	16·157	16·170	16·183	16·195	16·208	16·221	16·234	16·246
·22	16·259	16·272	16·286	16·299	16·313	16·326	16·340	16·353	16·367	16·380
·23	16·393	16·407	16·421	16·434	16·448	16·462	16·475	16·489	16·503	16·516
·24	16·530	16·544	16·558	16·572	16·586	16·600	16·614	16·628	16·642	16·656
·25	16·670	16·684	16·699	16·713	16·728	16·742	16·757	16·771	16·786	16·801
·26	16·816	16·831	16·846	16·861	16·876	16·891	16·906	16·921	16·936	16·951
·27	16·966	16·982	16·998	17·013	17·029	17·045	17·060	17·076	17·092	17·107
·28	17·123	17·139	17·156	17·172	17·189	17·214	17·222	17·238	17·255	17·271
·29	17·288	17·305	17·322	17·339	17·356	17·373	17·390	17·407	17·424	17·441
·30	17·459	17·478	17·496	17·515	17·533	17·552	17·570	[illegible]	17·607	17·625
·31	17·644	17·661	17·681	17·700	17·720	17·739	17·758	[illegible]	17·796	17·815
·32	17·836	17·857	17·878	17·899	17·920	17·941	17·962	[illegible]	18·004	18·025
·33	18·046	18·068	18·090	18·113	18·136	18·159	18·182	[illegible]	18·218	18·241
·34	18·274	18·301	18·328	18·354	18·381	18·408	18·434	[illegible]	18·488	18·515
·35	18·541	18·571	18·602	18·632	18·663	18·693	18·724	[illegible]	18·786	18·817
·36	18·847	18·885	18·923	18·961	18·999	19·037	19·075	19·113	19·152	19·191
·370	19·230	19·234	19·239	19·244	19·249	19·254	19·260	[illegible]	19·272	19·277
·371	19·283	19·288	19·293	19·298	19·304	19·309	19·314	19·319	19·325	19·331
·372	19·337	19·342	19·349	19·355	19·360	19·365	19·371	19·377	19·383	19·389
·373	19·395	19·401	19·407	19·413	19·419	19·424	19·430	19·436	19·442	19·449
·374	19·456	19·463	19·470	19·477	19·484	19·490	19·497	19·505	19·513	19·521
·375	19·528	19·535	19·542	19·549	19·556	19·562	19·568	19·575	19·582	19·589
·376	19·596	19·603	19·610	19·617	19·624	19·630	19·637	19·644	19·651	19·658
·377	19·666	19·673	19·680	19·688	19·695	19·701	19·708	19·715	19·724	19·739
·378	19·753	19·765	19·778	19·791	19·804	19·816	19·829	19·841	19·858	19·865
·379	19·877	19·890	19·903	19·916	19·929	19·940	19·952	19·965	19·978	19·991
·380	20·003	20·027	20·055	20·083	20·126	20·154	20·195	20·212	20·251	20·284

Eqn. +	9	8	7	6	5	4	3	2	1	0
	Moon's anomaly in days.									
·380	20·285	20·308	20·357	20·371	20·411	20·445	20·488	20·516	20·544	20·568
·379	20·580	20·593	20·606	20·619	20·631	20·644	20·657	20·670	20·683	20·696
378	20·708	20·720	20·732	20·744	20·757	20·771	20·784	20·797	20·810	20·822
·377	20·836	20·851	20·860	20·867	20·874	20·882	20·889	20·897	20·904	20·911
·376	20·919	20·926	20·933	20·940	20·947	20·955	20·962	20·969	20·976	20·983
375	20·990	20·997	21·004	21·011	21·017	21·025	21·032	21·039	21·046	21·053
374	21·060	21·068	21·076	21·084	21·091	21·099	21·106	21·113	21·120	21·127
373	21·134	21·141	21·148	21·153	21·159	21·166	21·172	21·178	21·184	21·190
372	21·196	21·202	21·209	21·214	21·220	21·227	21·232	21·238	21·245	21·250
371	21·256	21·262	21·268	21·274	21·279	21·285	21·291	21·296	21·301	21·306
·370	21·312	21·317	21·323	21·329	21·335	21·342	21·347	21·352	21·357	21·361
36	21·402	21·443	21·484	21·524	21·564	21·604	21·644	21·684	21·724	21·764
35	21·796	21·829	21·862	21·895	21·928	21·960	21·993	22·025	22·058	22·090
34	22·118	22·147	22·176	22·205	22·233	22·256	22·291	22·319	22·348	22·377
33	22·402	22·427	22·452	22·477	22·502	22·527	22·552	22·577	22·601	22·625
32	22·648	22·671	22·694	22·717	22·743	22·763	22·786	22·809	22·832	22·855
31	22·878	22·899	22·920	22·941	22·962	22·983	23·005	23·026	23·048	23·069
30	23·068	23·108	23·128	23·149	23·169	23·190	23·210	23·229	23·251	23·272
29	23·292	23·311	23·330	23·349	23·368	23·387	23·406	23·425	23·444	23·463
·28	23·482	23·500	23·519	23·537	23·556	23·574	23·593	23·611	23·630	23·648
·27	23·666	23·683	23·701	23·719	23·736	23·754	23·772	23·789	23·807	23·825
26	23·842	23·859	23·876	23·893	23·910	23·927	23·944	23·962	23·978	23·990
25	24·012	24·029	24·046	24·062	24·079	24·099	24·112	24·128	24·145	24·161
24	24·177	24·191	24·209	24·225	24·241	24·257	24·273	24·299	24·305	24·321
23	24·337	24·352	24·368	24·381	24·399	24·415	24·431	24·446	24·462	24·478
·22	24·493	24·508	24·524	24·539	24·555	24·570	24·586	24·599	24·617	24·632
·21	24·647	24·661	24·676	24·691	24·706	24·724	24·735	24·750	24·766	24·780
·20	24·795	24·810	24·824	24·838	24·853	24·867	24·882	24·896	24·911	24·925
·19	24·940	24·955	24·970	24·984	24·999	25·007	25·028	25·038	25·057	25·071
·18	25·085	25·100	25·115	25·129	25·143	25·157	25·171	25·185	25·199	25·213
·17	25·227	25·241	25·255	25·269	25·283	25·299	25·311	25·325	25·339	25·353
·16	25·367	25·380	25·394	25·408	25·421	25·435	25·449	25·462	25·476	25·490
·15	25·504	25·518	25·532	25·545	25·558	25·572	25·585	25·599	25·612	25·626
·14	25·639	25·652	25·665	25·678	25·692	25·705	25·718	25·732	25·745	25·759
·13	25·773	25·786	25·800	25·811	25·827	25·840	25·854	25·867	25·881	25·894
·12	25·908	25·921	25·935	25·948	25·961	25·974	25·988	26·001	26·014	26·027
·11	26·041	26·054	26·067	26·080	26·093	26·106	26·119	26·132	26·145	26·158
·10	26·171	26·184	26·197	26·210	26·223	26·236	26·249	26·262	26·275	26·288
·09	26·301	26·314	26·327	26·340	26·353	26·366	26·379	26·392	26·404	26·417
·08	26·430	26·443	26·456	26·469	26·482	26·495	26·508	26·521	26·534	26·546
07	26·559	26·572	26·585	26·598	26·611	26·624	26·637	26·649	26·661	26·674
06	26·687	26·700	26·713	26·726	26·739	26·752	26·765	26·777	26·790	26·802
05	26·815	26·827	26·840	26·852	26·865	26·877	26·890	26·902	26·915	26·927
04	26·940	26·952	26·965	26·977	26·990	27·002	27·015	27·027	27·040	27·052
03	27·065	27·077	27·090	27·102	27·115	27·127	27·140	27·153	27·165	27·178
02	27·191	27·204	27·217	27·229	27·242	27·255	27·267	27·280	27·298	27·305
·01	27·318	27·330	27·343	27·355	27·368	27·380	27·393	27·405	27·418	27·430
·00	27·443	27·455	27·462	27·480	27·493	27·505	27·518	27·530	27·542	27·555

g—EYE-TABLE FOR YOGAS.

Moon's anomaly and moon's equation of the centre in days and fractions of a day.

(ĀRYA SIDDHĀNTA.)

Eqn.	0	1	2	3	4	5	6	7	8	9	Eqn.	9	8	7	6	5	4	3	2	1	0
—	Moon's anomaly in days.										—	Moon's anomaly in days.									
·00	0·000	0·013	0·026	0·040	0·053	0·066	0·080	0·093	0·106	0·119	·354	...	...	...	...	...	7·248	7·275	7·306	7·338	7·370
·01	0·133	0·146	0·158	0·173	0·186	0·199	0·213	0·226	0·239	0·253	·353	7·402	7·434	7·466	7·498	7·530	7·543	7·557	7·571	7·584	7·598
·02	0·266	0·280	0·293	0·307	0·320	0·334	0·347	0·361	0·374	0·388	·352	7·612	7·625	7·639	7·653	7·666	7·679	7·693	7·706	7·720	7·734
·03	0·402	0·415	0·429	0·442	0·456	0·469	0·483	0·496	0·510	0·523	·351	7·747	7·761	7·775	7·788	7·802	7·814	7·822	7·830	7·838	7·845
·04	0·537	0·550	0·564	0·577	0·591	0·604	0·618	0·631	0·645	0·658	·350	7·853	7·860	7·868	7·875	7·883	7·889	7·897	7·904	7·912	7·919
·05	0·671	0·684	0·698	0·711	0·725	0·738	0·752	0·765	0·779	0·793	·34	7·993	8·067	8·118	8·169	8·220	8·271	8·322	8·373	8·424	8·475
·06	0·806	0·820	0·833	0·847	0·860	0·874	0·887	0·901	0·914	0·928	·33	8·513	8·550	8·587	8·624	8·662	8·699	8·736	8·774	8·811	8·848
·07	0·942	0·956	0·970	0·983	0·997	1·011	1·024	1·038	1·052	1·065	·32	8·879	8·910	8·941	8·972	9·003	9·034	9·065	9·095	9·125	9·155
·08	1·079	1·093	1·107	1·120	1·134	1·148	1·161	1·175	1·189	1·202	·31	9·181	9·207	9·233	9·259	9·285	9·311	9·337	9·363	9·388	9·418
·09	1·216	1·230	1·244	1·258	1·272	1·286	1·300	1·314	1·328	1·342	·30	9·437	9·461	9·485	9·509	9·533	9·557	9·581	9·605	9·628	9·651
·10	1·356	1·371	1·385	1·399	1·413	1·427	1·441	1·455	1·469	1·483	·29	9·672	9·693	9·714	9·735	9·756	9·777	9·798	9·819	9·840	9·860
·11	1·497	1·512	1·526	1·540	1·554	1·568	1·582	1·596	1·610	1·624	·28	9·880	9·900	9·920	9·940	9·960	9·980	10·000	10·020	10·039	10·058
·12	1·638	1·652	1·666	1·681	1·695	1·710	1·724	1·739	1·753	1·768	·27	10·077	10·095	10·113	10·131	10·150	10·168	10·186	10·205	10·223	10·241
·13	1·783	1·797	1·812	1·826	1·840	1·854	1·868	1·882	1·896	1·910	·26	10·259	10·277	10·295	10·318	10·331	10·349	10·367	10·385	10·403	10·420
·14	1·924	1·938	1·952	1·967	1·981	1·996	2·010	2·025	2·039	2·053	·25	10·437	10·454	10·471	10·488	10·505	10·522	10·539	10·556	10·573	10·589
·15	2·068	2·083	2·098	2·113	2·128	2·143	2·158	2·173	2·188	2·203	·24	10·606	10·622	10·638	10·654	10·670	10·686	10·702	10·718	10·734	10·750
·16	2·218	2·232	2·247	2·262	2·277	2·292	2·307	2·322	2·337	2·352	·23	10·766	10·781	10·797	10·812	10·828	10·843	10·859	10·874	10·890	10·905
·17	2·367	2·382	2·397	2·413	2·428	2·443	2·459	2·474	2·489	2·504	·22	10·921	10·936	10·951	10·966	10·981	10·996	11·011	11·026	11·041	11·056
·18	2·520	2·535	2·551	2·566	2·582	2·597	2·613	2·628	2·644	2·659	·21	11·071	11·086	11·101	11·116	11·130	11·145	11·160	11·174	11·189	11·204
·19	2·675	2·691	2·707	2·722	2·738	2·754	2·769	2·785	2·801	2·816	·20	11·219	11·233	11·247	11·261	11·275	11·289	11·303	11·317	11·331	11·345
·20	2·832	2·848	2·864	2·880	2·896	2·912	2·928	2·944	2·960	2·976	·19	11·359	11·372	11·386	11·400	11·413	11·427	11·441	11·454	11·468	11·482
·21	2·993	3·010	3·027	3·043	3·060	3·077	3·093	3·110	3·127	3·144	·18	11·496	11·509	11·523	11·536	11·550	11·563	11·577	11·590	11·604	11·617
·22	3·161	3·178	3·195	3·212	3·229	3·246	3·263	3·280	3·297	3·314	·17	11·631	11·644	11·657	11·670	11·684	11·697	11·710	11·724	11·737	11·750
·23	3·332	3·349	3·367	3·384	3·402	3·419	3·437	3·454	3·472	3·489	·16	11·763	11·776	11·789	11·802	11·815	11·828	11·841	11·854	11·867	11·879
·24	3·507	3·525	3·543	3·561	3·579	3·597	3·615	3·633	3·651	3·669	·15	11·892	11·905	11·918	11·931	11·944	11·957	11·970	11·983	11·996	12·009
·25	3·688	3·706	3·725	3·744	3·763	3·782	3·801	3·820	3·839	3·858	·14	12·022	12·034	12·046	12·059	12·071	12·084	12·096	12·109	12·121	12·133
·26	3·877	3·896	3·916	3·936	3·956	3·976	3·996	4·016	4·036	4·056	·13	12·145	12·157	12·169	12·181	12·193	12·205	12·217	12·229	12·242	12·255
·27	4·076	4·096	4·116	4·137	4·157	4·177	4·198	4·218	4·238	4·258	·12	12·267	12·280	12·292	12·305	12·317	12·330	12·342	12·355	12·367	12·379
·28	4·279	4·300	4·321	4·343	4·365	4·387	4·409	4·431	4·453	4·475	·11	12·391	12·403	12·415	12·427	12·439	12·451	12·463	12·475	12·487	12·500
·29	4·497	4·519	4·542	4·565	4·588	4·611	4·634	4·657	4·680	4·703	·10	12·512	12·524	12·536	12·549	12·560	12·572	12·584	12·596	12·608	12·621
·30	4·726	4·751	4·776	4·802	4·828	4·854	4·880	4·906	4·932	4·958	·09	12·633	12·645	12·657	12·669	12·681	12·693	12·705	12·717	12·729	12·741
·31	4·984	5·011	5·038	5·066	5·094	5·122	5·150	5·178	5·206	5·234	·08	12·753	12·764	12·776	12·788	12·799	12·811	12·823	12·834	12·846	12·858
·32	5·262	5·294	5·326	5·358	5·391	5·424	5·457	5·490	5·523	5·556	·07	12·870	12·881	12·893	12·905	12·916	12·928	12·940	12·951	12·963	12·975
·33	5·589	5·628	5·667	5·706	5·745	5·785	5·825	5·864	5·903	5·942	·06	12·987	12·999	13·010	13·022	13·033	13·045	13·056	13·068	13·079	13·091
·34	5·982	6·035	6·088	6·141	6·194	6·247	6·300	6·353	6·406	6·482	·05	13·102	13·114	13·126	13·137	13·149	13·160	13·172	13·183	13·195	13·206
·350	6·553	6·565	6·573	6·580	6·588	6·596	6·604	6·611	6·619	6·626	·04	13·217	13·228	13·240	13·251	13·263	13·274	13·286	13·297	13·309	13·320
·351	6·634	6·641	6·649	6·657	6·665	6·680	6·694	6·707	6·721	6·735	·03	13·332	13·343	13·355	13·366	13·378	13·389	13·401	13·412	13·424	13·435
·352	6·748	6·762	6·776	6·789	6·803	6·818	6·831	6·845	6·859	6·872	·02	13·447	13·459	13·470	13·482	13·493	13·505	13·516	13·528	13·539	13·551
·353	6·886	6·900	6·913	6·927	6·941	6·956	6·988	7·020	7·052	7·084	·01	13·562	13·574	13·585	13·596	13·608	13·619	13·630	13·642	13·653	13·664
·354	7·116	7·148	7·180	7·211	7·243	...	..	...	...	...	·00	13·676	13·687	13·698	13·709	13·721	13·732	13·743	13·755	13·766	13·777

g—EYE-TABLE FOR YOGAS—*continued.*

Moon's anomaly and moon's equation of the centre in days and fractions of a day.

(ÂRYA SIDDHÂNTA.)

Eqn. +	0	1	2	3	4	5	6	7	8	9	Eqn. +	9	8	7	6	5	4	3	2	1	0
	Moon's anomaly in days.											Moon's anomaly in days.									
·00	13·777	13·788	13·799	13·811	13·822	13·833	13·845	13·856	13·867	13·878	·354	...	...	...	...	...	20·812	20·344	20·375	20·407	20·439
·01	13·890	13·901	13·912	13·924	13·935	13·946	13·958	13·969	13·980	13·992	·353	20·471	20·503	20·535	20·567	20·599	20·614	20·628	20·642	20·655	20·669
·02	14·003	14·015	14·026	14·038	14·049	14·061	14·072	14·084	14·095	14·107	·352	20·683	20·696	20·710	20·724	20·737	20·752	20·766	20·779	20·793	20·807
·03	14·119	14·130	14·142	14·153	14·165	14·176	14·188	14·199	14·211	14·222	·351	20·820	20·834	20·848	20·862	20·875	20·889	20·897	20·905	20·913	20·920
·04	14·234	14·245	14·257	14·268	14·279	14·291	14·302	14·314	14·325	14·337	·350	20·928	20·935	20·943	20·950	20·958	20·966	20·974	20·981	20·989	20·996
·05	14·348	14·359	14·371	14·382	14·394	14·405	14·417	14·428	14·440	14·452	·34	21·072	21·148	21·201	21·254	21·307	21·360	21·413	21·466	21·519	21·572
·06	14·463	14·475	14·486	14·498	14·509	14·521	14·532	14·544	14·555	14·567	·33	21·612	21·651	21·690	21·729	21·769	21·808	21·847	21·887	21·926	21·965
·07	14·579	14·591	14·603	14·614	14·626	14·638	14·649	14·661	14·673	14·684	·32	21·998	22·031	22·064	22·097	22·130	22·163	22·196	22·228	22·260	22·292
·08	14·696	14·708	14·720	14·731	14·743	14·755	14·766	14·778	14·790	14·801	·31	22·320	21·348	22·376	22·404	22·432	22·460	22·488	22·516	22·543	22·570
·09	14·813	14·825	14·837	14·849	14·861	14·873	14·885	14·897	14·909	14·921	·30	22·596	22·622	22·648	22·674	22·700	22·726	22·752	22·778	22·803	22·828
·10	14·933	14·946	14·958	14·970	14·982	14·994	15·006	15·018	15·030	15·042	·29	22·851	22·874	22·897	22·920	22·943	22·966	22·989	23·012	23·035	23·057
·11	15·054	15·067	15·079	15·091	15·103	15·115	15·127	15·139	15·151	15·163	·28	23·079	23·101	23·123	23·145	23·167	23·189	23·211	23·233	23·254	23·275
·12	15·175	15·187	15·199	15·212	15·224	15·237	15·249	15·262	15·274	15·287	·27	23·296	23·316	23·336	23·356	23·377	23·397	23·417	23·438	23·458	23·478
·13	15·299	15·312	15·325	15·337	15·349	15·361	15·373	15·385	15·397	15·409	·26	23·498	23·518	23·538	23·558	23·578	23·598	23·618	23·638	23·658	23·677
·14	15·421	15·433	15·445	15·458	15·470	15·483	15·495	15·508	15·520	15·532	·25	23·696	23·715	23·734	23·753	23·772	23·791	23·810	23·829	23·848	23·866
·15	15·545	15·558	15·571	15·584	15·597	15·610	15·623	15·636	15·649	15·662	·24	23·885	23·903	23·921	23·939	23·957	23·975	23·993	24·011	24·029	24·047
·16	15·675	15·687	15·700	15·713	15·726	15·739	15·752	15·765	15·778	15·791	·23	24·065	24·082	24·100	24·117	24·135	24·152	24·170	24·187	24·205	24·222
·17	15·804	15·817	15·830	15·844	15·857	15·870	15·884	15·897	15·910	15·923	·22	24·240	24·257	24·274	24·291	24·308	24·325	24·342	24·359	24·376	24·393
·18	15·937	15·950	15·964	15·977	15·991	16·004	16·018	16·031	16·045	16·058	·21	24·410	24·427	24·444	24·461	24·477	24·494	24·511	24·527	24·544	24·561
·19	16·072	16·086	16·100	16·113	16·127	16·141	16·154	16·168	16·182	16·195	·20	24·578	24·594	24·610	24·626	24·642	24·658	24·674	24·690	24·706	24·722
·20	16·209	16·223	16·237	16·251	16·265	16·279	16·293	16·807	16·321	16·335	·19	24·738	24·753	24·769	24·785	24·800	24·816	24·832	24·847	24·863	24·879
·21	16·350	16·365	16·380	16·394	16·409	16·424	16·438	16·453	16·468	16·483	·18	24·895	24·910	24·926	24·941	24·957	24·972	24·988	25·003	25·019	25·034
·22	16·498	16·513	16·528	16·543	16·558	16·573	16·588	16·603	16·618	16·633	·17	25·050	25·065	25·080	25·095	25·111	25·126	25·141	25·157	25·172	25·187
·23	16·649	16·664	16·680	16·695	16·711	16·726	16·742	16·757	16·773	16·788	·16	25·202	25·217	25·232	25·247	25·262	25·277	25·292	25·307	25·322	25·336
·24	16·804	16·820	16·836	16·852	16·868	16·884	16·900	16·916	16·932	16·948	·15	25·351	25·366	25·381	25·396	25·411	25·426	25·441	25·456	25·471	25·486
·25	16·966	16·982	16·999	17·016	17·033	17·050	17·067	17·084	17·101	17·118	·14	25·501	25·515	25·529	25·544	25·558	25·573	25·587	25·602	25·616	25·630
·26	17·135	17·152	17·170	17·188	17·206	17·224	17·242	17·260	17·278	17·296	·13	25·644	25·658	25·672	25·686	25·700	25·714	25·728	25·742	25·757	25·772
·27	17·314	17·332	17·350	17·369	17·387	17·405	17·424	17·442	17·460	17·478	·12	25·786	25·801	25·815	25·830	25·844	25·859	25·873	25·888	25·902	25·916
·28	17·497	17·516	17·535	17·555	17·575	17·595	17·615	17·635	17·655	17·675	·11	25·930	25·944	25·958	25·972	25·986	26·000	26·014	26·028	26·042	26·057
·29	17·695	17·715	17·736	17·757	17·778	17·799	17·820	17·841	17·862	17·883	·10	26·071	26·085	26·099	26·113	26·127	26·141	26·155	26·169	26·183	26·198
·30	17·904	17·927	17·950	17·974	17·998	18·022	18·046	18·070	18·094	18·118	·09	26·212	26·226	26·240	26·254	26·268	26·282	26·296	26·310	26·324	26·338
·31	18·142	18·167	18·192	18·218	18·244	18·270	18·296	18·322	18·348	18·374	·08	26·352	26·365	26·379	26·393	26·406	26·420	26·434	26·447	26·461	26·475
·32	18·400	18·430	18·460	18·490	18·521	18·552	18·583	18·614	18·645	18·676	·07	26·489	26·502	26·516	26·530	26·543	26·557	26·571	26·584	26·598	26·612
·33	18·707	18·744	18·781	18·819	18·856	18·893	18·931	18·968	19·005	19·042	·06	26·626	26·640	26·653	26·667	26·680	26·694	26·707	26·721	26·734	26·748
·34	19·080	19·131	19·182	19·233	19·284	19·335	19·386	19·437	19·488	19·562	·05	26·761	26·775	26·789	26·802	26·816	26·829	26·843	26·856	26·870	26·883
·350	19·636	19·643	19·651	19·658	19·666	19·672	19·680	19·687	19·695	19·702	·04	26·896	26·910	26·923	26·937	26·950	26·964	26·977	27·990	27·004	27·017
·351	19·710	19·717	19·725	19·733	19·741	19·754	19·768	19·781	19·795	19·809	·03	27·031	27·044	27·058	27·071	27·085	27·098	27·112	27·125	27·139	27·152
·352	19·822	19·836	19·850	19·863	19·877	19·890	19·903	19·917	19·931	19·944	·02	27·166	27·180	27·193	27·207	27·220	27·234	27·247	27·291	27·274	27·288
·353	19·958	19·972	19·985	19·999	20·013	20·025	20·057	20·089	20·121	20·153	·01	27·301	27·315	27·328	27·341	27·355	27·368	27·381	27·395	27·408	27·421
·354	20·185	20·217	20·249	20·280	20·312	...	...	...	...	...	·00	27·435	27·448	27·461	27·474	27·488	27·501	27·514	27·528	27·541	27·555

h—EYE-TABLE FOR TITHIS.

Sun's anomaly and equation of the centre expressed in days and fractions of a day.

(ĀRYA SIDDHĀNTA.)

Sun's anomaly in days of the solar year.

Eqn. +	9	8	7	6	5	4	3	2	1	0
·173	..	...	...	...	0·02	0·12	0·32	0·52	0·72	0·92
·172	1·23	1·38	1·52	1·66	1·80	1·94	2·08	2·22	2·36	2·50
·171	2·64	2·78	2·92	3·06	3·20	3·34	3·48	3·62	3·76	3·90
·170	4·04	4·18	4·32	4·45	4·60	4·73	4·86	4·99	5·12	5·25
·16	6·45	7·59	8·74	9·16	10·64	11·58	12·55	13·33	14·13	14·93
·15	15·72	16·52	17·22	17·92	18·62	19·32	20·02	20·67	21·30	21·93
·14	22·54	23·17	23·80	24·39	24·97	25·58	26·10	26·67	27·23	27·80
·13	28·85	28·84	29·36	29·88	30·41	30·93	31·44	31·94	32·43	32·91
·12	33·39	33·87	34·35	34·84	35·33	35·79	36·25	36·70	37·15	37·61
·11	38·05	38·50	38·96	39·41	39·84	40·27	40·70	41·12	41·55	41·98
·10	42·40	42·82	43·24	43·65	44·06	44·47	44·88	45·28	45·69	46·10
·09	46·49	46·90	47·29	47·68	48·08	48·47	48·86	49·25	49·64	50·03
·08	50·41	50·80	51·19	51·55	51·93	52·31	52·68	53·05	53·43	53·80
·07	54·16	54·54	54·90	55·27	55·64	56·00	56·37	56·73	57·09	57·46
·06	57·81	58·17	58·53	58·88	59·25	59·60	59·96	60·31	60·66	61·02
·05	61·36	61·72	62·07	62·42	62·78	63·12	63·47	63·81	64·16	64·51
·04	64·84	65·19	65·53	65·88	66·23	66·57	66·91	67·25	67·59	67·93
·03	68·26	68·59	68·93	69·27	69·62	69·97	70·31	70·64	70·98	71·31
·02	71·64	71·97	72·31	72·65	73·00	73·33	73·66	73·99	74·32	74·66
·01	74·98	75·31	75·64	75·98	76·32	76·65	76·98	77·31	77·65	77·98
·00	78·30	78·63	78·96	79·29	79·63	79·96	80·29	80·62	80·96	81·29

Sun's anomaly in days of the solar year

Eqn. —	0	1	2	3	4	5	6	7	8	9
·00	81·29	81·62	81·95	82·28	82·61	82·94	83·28	83·61	83·94	84·28
·01	84·60	84·93	85·26	85·59	85·92	86·26	86·60	86·93	87·26	87·60
·02	87·92	88·25	88·58	88·91	89·24	89·58	89·92	90·26	90·60	90·93
·03	91·26	91·59	91·93	92·27	92·60	92·95	93·30	93·64	93·98	94·32
·04	94·65	94·99	95·32	95·66	96·00	96·34	96·69	97·04	97·39	97·73
·05	98·07	98·41	98·76	99·11	99·45	99·80	100·15	100·50	100·86	101·26
·06	101·55	101·91	102·26	102·62	102·97	103·32	103·69	104·04	104·40	104·76
·07	105·12	105·48	105·84	106·21	106·57	106·93	107·31	107·67	108·03	108·41
·08	108·77	109·15	109·52	109·89	110·27	110·64	111·02	111·40	111·77	112·16
·09	112·54	112·93	113·32	113·71	114·10	114·49	114·89	115·28	115·68	116·08
·10	116·48	116·88	117·29	117·70	118·10	118·51	118·92	119·33	119·75	120·18
·11	120·59	121·02	121·45	121·88	122·30	122·73	123·17	123·61	124·07	124·52
·12	124·97	125·42	125·87	126·33	126·78	127·24	127·74	128·22	128·70	129·19
·13	129·66	130·14	130·63	131·13	131·65	132·17	132·67	133·22	133·74	134·26
·14	134·77	135·34	135·91	136·47	137·04	137·61	138·18	138·78	139·40	140·03
·15	140·65	141·27	141·90	142·55	143·25	143·95	144·66	145·36	146·06	146·86
·16	147·65	148·45	149·25	150·03	150·99	151·93	152·88	153·83	154·98	156·12
·170	157·33	157·46	157·60	157·73	157·87	158·00	158·14	158·28	158·42	158·56
·171	158·70	158·84	158·98	159·12	159·26	159·40	159·54	159·68	159·82	159·96
·172	160·10	160·24	160·38	160·52	160·66	160·80	160·94	161·08	161·22	161·36
·173	161·56	161·76	161·96	162·16	162·36	162·56	162·76	162·96	163·16	163·36
·174	163·56	163·76	163·96	164·16	164·36	164·56	164·76	164·96	165·17	165·51
·175	165·86	166·20	166·55	166·89	167·24	167·59	167·94	168·28	168·63	168·98
·176	169·93	170·88	171·83	172·78	...	...	...	.	...	...

Eqn. —	9	8	7	6	5	4	3	2	1	0
·176		...	..		.	.	172·78	173·78	174·68	175·63
·175	176·59	176·94	177·29	177·63	177·97	178·31	178·66	179·00	179·35	179·69
·174	180·04	180·38	180·59	180·79	180·99	181·19	181·39	181·59	181·79	181·99
·173	182·19	182·39	182·59	182·79	182·99	183·19	183·39	183·59	183·79	183·99
·172	184·19	184·33	184·47	184·61	184·75	184·89	185·03	185·17	185·31	185·45
·171	185·59	185·73	185·87	186·01	186·15	186·29	186·43	186·57	186·71	186·85
·170	186·99	187·13	187·25	187·39	187·53	187·66	187·80	187·94	188·08	188·22
·16	189·44	190·48	191·72	192·67	193·60	194·54	195·50	196·28	197·04	197·88
·15	198·69	199·48	200·18	200·88	201·56	202·26	202·96	203·61	204·23	204·86
·14	205·49	206·12	206·74	207·33	207·89	208·45	209·02	209·58	210·15	210·71
·13	211·25	211·76	212·28	212·80	213·31	213·82	214·34	214·84	215·32	215·80
·12	216·29	216·78	217·26	217·74	218·21	218·67	219·12	219·57	220·03	220·48
·11	220·94	221·39	221·84	222·29	222·70	223·13	223·55	223·98	224·40	224·83
·10	225·26	225·69	226·11	226·51	226·90	227·31	227·71	228·22	228·52	228·93
·09	229·34	229·74	230·13	230·52	230·90	231·29	231·68	232·07	232·46	232·84
08	233·24	233·68	234·00	234·37	234·73	235·10	235·48	235·85	236·22	236·59
·07	236·97	237·34	237·71	238·07	238·42	238·78	239·14	239·50	239·86	240·23
·06	240·60	240·96	241·31	241·67	242·01	242·36	242·71	243·06	243·42	243·77
·05	244·13	244·48	244·83	245·18	245·52	245·86	246·20	246·55	246·89	247·24
·04	247·59	247·93	248·28	248·62	248·95	249·29	249·63	249·96	250·30	250·64
·03	250·98	251·32	251·66	251·99	252·32	252·67	253·00	253·34	253·67	254·00
·02	254·35	254·68	255·02	255·35	255·68	256·01	256·34	256·67	257·00	257·33
·01	257·67	257·98	258·33	258·66	258·98	259·31	259·64	259·97	260·30	260·63
·00	260·97	261·29	261·62	261·95	262·27	262·60	262·93	263·26	263·59	263·92

Eqn. +	0	1	2	3	4	5	6	7	8	9
·00	263·92	264·25	264·57	264·90	265·23	265·56	265·88	266·21	266·54	266·87
·01	267·21	267·53	267·86	268·19	268·53	268·86	269·18	269·51	269·84	270·17
·02	270·51	270·84	271·17	271·50	271·82	272·16	272·48	272·82	273·15	273·48
03	273·83	274·16	274·50	274·83	275·17	275·51	275·84	276·18	276·51	276·85
04	277·20	277·53	277·87	278·21	278·54	278·88	279·21	279·56	279·90	280·24
·05	280·60	280·94	281·29	281·63	281·97	282·32	282·65	283·00	283·35	283·70
·06	284·06	284·42	284·77	285·12	285·47	285·82	286·17	286·52	286·88	287·24
07	287·61	287·97	288·33	288·69	289·05	289·41	289·77	290·13	290·49	290·79
08	291·24	291·61	291·99	292·36	292·73	293·10	293·46	293·83	294·21	294·59
·09	294·99	295·38	295·77	296·15	296·54	296·93	297·31	297·70	298·09	298·56
10	298·91	299·31	299·72	300·12	300·52	300·93	301·32	301·73	302·14	302·57
11	303·00	303·43	303·85	304·28	304·70	305·13	305·54	305·99	306·44	306·89
·12	307·36	307·81	308·26	308·71	309·16	309·62	310·09	310·58	311·06	311·54
13	312·13	312·51	312·99	313·49	314·01	314·59	315·04	315·55	316·07	316·59
14	317·12	317·69	318·25	318·82	319·38	319·85	320·50	321·09	321·72	322·34
·15	322·98	323·60	324·22	324·87	325·57	326·27	326·96	327·65	328·34	329·15
·16	329·96	330·75	331·55	332·34	333·29	334·23	335·16	336·11	337·25	338·40
170	339·62	339·75	339·89	340·02	340·16	340·29	340·43	340·57	340·71	340·85
·171	340·99	341·13	341·27	341·41	341·55	341·69	341·83	341·97	342·11	342·25
·172	342·39	342·53	342·67	342·81	342·95	343·09	343·23	343·37	343·51	343·65
·173	343·85	344·05	344·25	344·45	344·65	344·85	345·05	345·25	345·45	345·65
174	345·85	346·05	346·25	346·45	346·65	346·85	347·05	347·25	347·46	347·80
175	348·15	348·49	348·84	349·18	349·53	349·87	350·21	350·55	350·90	351·25
176	352·20	353·15	354·10	355·05	..		...	.	.	...
...	9	8	7	6	5	4	3	2	1	0
176	..	..	.	...	...	. .	355·05	356·00	356·95	357·90
175	358·86	359·21	359·56	359·90	360·26	360·60	360·95	361·29	361·64	361·98
·174	362·33	362·67	362·88	363·08	363·28	363·48	363·68	363·88	364·08	364·28
·173	364·48	364·68	364·88	365·08	...	...	.	...	...	...

i—EYE-TABLE FOR YOGAS.

Sun's anomaly and equation of the centre expressed in days and fractions of a day.

(ĀRYA SIDDHĀNTA.)

Sun's anomaly in days of the solar year.

Eqn. −	9	8	7	6	5	4	3	2	1	0
·14	1·22	2·91	4·59	6·27	7·40	8·55	9·70	10·88	12·00	13·15
·13	14·00	14·85	15·70	16·84	17·37	18·21	19·06	19·90	20·75	21·59
·12	22·37	22·95	23·63	24·31	24·98	25·56	26·34	27·02	27·70	28·38
·11	28·97	29·55	30·14	30·72	31·30	31·88	32·47	33·05	33·64	34·22
·10	34·75	35·29	35·82	36·35	36·88	37·41	37·94	38·48	39·01	39·54
·09	40·03	40·53	41·02	41·52	42·00	42·50	42·99	43·49	43·98	44·47
·08	44·93	45·40	45·86	46·32	46·77	47·23	47·69	48·15	48·61	49·07
·07	49·51	49·95	50·39	50·83	51·26	51·70	52·14	52·58	53·02	53·47
·06	53·89	54·31	54·74	55·17	55·59	56·01	56·44	56·86	57·28	57·70
·05	58·11	58·52	58·93	59·34	59·74	60·15	60·56	60·97	61·38	61·79
·04	62·20	62·60	63·01	63·41	63·80	64·20	64·60	65·00	65·40	65·80
·03	66·20	66·60	67·00	67·41	67·78	68·17	68·57	68·96	69·36	69·75
·02	70·14	70·53	70·92	71·31	71·69	72·08	72·47	72·86	73·25	73·63
·01	74·02	74·41	74·79	75·17	75·54	75·92	76·31	76·70	77·08	77·47
·00	77·86	78·25	78·64	79·02	79·39	79·77	80·15	80·53	80·91	81·29

Sun's anomaly in days of the solar year.

Eqn. +	...	...	...	...	...	...	..	...	...	...
·151	...	...	172·95	174·09	175·22	176·35	176·73	177·12	177·51	177·90
·150	178·29	178·68	179·07	179·46	179·85	180·23	180·47	180·70	180·93	181·16
·14	183·55	185·24	186·92	188·60	189·76	190·91	192·06	193·21	194·36	195·51
·13	196·36	197·20	198·05	198·89	199·75	200·59	201·44	202·28	203·13	203·97
·12	204·65	205·33	206·01	206·69	207·38	208·06	208·74	209·42	210·10	210·78
·11	211·37	211·95	212·54	213·12	213·72	214·30	214·89	215·47	216·06	216·64
·10	217·17	217·71	218·24	218·77	219·32	219·85	220·38	220·92	221·45	221·98
·09	222·47	222·97	223·46	223·96	224·46	224·96	225·45	225·95	226·44	226·93
·08	227·40	227·86	228·32	228·78	229·25	229·71	230·17	230·63	231·09	231·54
·07	231·99	232·43	232·87	233·31	233·76	234·20	234·64	235·08	235·52	235·96
·06	236·38	236·80	237·23	237·66	238·10	238·52	238·95	239·37	239·79	240·21
·05	240·62	241·03	241·44	241·85	242·27	242·68	243·09	243·50	243·91	244·33
·04	244·74	245·15	245·56	245·96	246·37	246·77	247·17	247·57	247·97	248·37
·03	248·77	249·17	249·57	249·96	250·37	250·76	251·16	251·55	251·94	252·34
·02	252·73	253·12	253·51	253·90	254·30	254·69	255·08	255·46	255·84	256·24
·01	256·63	257·02	257·40	257·78	258·17	258·56	258·94	259·32	259·70	260·08
·00	260·47	260·86	261·25	261·63	262·02	262·40	262·78	263·16	263·54	263·92

Sun's anomaly in days of the solar year.

Eqn. +	0	1	2	3	4	5	6	7	8	9
·00	81·29	81·67	82·05	82·43	82·81	83·19	83·56	83·94	84·33	84·72
·01	85·11	85·49	85·87	86·26	86·65	87·03	87·40	87·78	88·16	88·55
·02	88·94	89·32	89·71	90·10	90·49	90·88	91·26	91·65	92·04	92·43
·03	92·82	93·21	93·61	94·00	94·40	94·79	95·18	95·57	95·97	96·37
·04	96·77	97·17	97·57	97·97	98·37	98·77	99·16	99·56	99·97	100·38
·05	100·79	101·20	101·61	102·02	102·43	102·84	103·24	103·65	104·06	104·47
·06	104·88	105·30	105·72	106·14	106·57	106·99	107·41	107·84	108·27	108·69
·07	109·11	109·55	109·99	110·43	110·87	111·31	111·74	112·18	112·62	113·06
·08	113·50	113·96	114·42	114·88	115·34	115·80	116·25	116·71	117·17	117·64
·09	118·11	118·60	119·09	119·59	120·08	120·59	121·06	121·56	122·05	122·55
·10	123·04	123·57	124·10	124·64	125·17	125·70	126·23	126·76	127·29	127·83
·11	128·36	128·94	129·53	130·11	130·70	131·28	131·86	132·44	133·03	133·61
·12	134·20	134·88	135·56	136·24	136·92	137·60	138·27	138·95	139·63	140·31
·13	140·99	141·83	142·68	143·52	144·37	145·21	146·05	146·89	147·74	148·58
·14	149·43	150·58	151·73	152·88	154·53	155·18	156·31	157·99	159·67	161·36
·150	163·76	163·99	164·22	164·45	164·69	165·08	165·47	165·86	166·25	166·64
·151	167·03	167·41	167·80	168·19	168·57	169·70	170·83	171·96	...	...

Maximum 172·45 has equation ·15174.

Eqn. −	0	1	2	3	4	5	6	7	8	9
·00	263·92	264·30	264·68	265·06	265·44	265·82	266·21	266·59	266·98	267·37
·01	267·75	268·13	268·51	268·90	269·29	269·67	270·06	270·44	270·82	271·21
·02	271·61	271·99	272·38	272·77	273·16	273·55	273·95	274·34	274·78	275·12
·03	275·50	275·89	276·29	276·68	277·08	277·47	277·88	278·27	278·67	279·07
·04	279·47	279·87	280·27	280·67	281·07	281·47	281·88	282·28	282·69	289·09
·05	283·50	283·91	284·32	284·73	285·14	285·55	285·97	286·38	286·79	287·20
·06	287·62	288·04	288·46	288·88	289·31	289·73	290·17	290·60	291·03	291·45
·07	291·87	292·31	292·75	293·19	293·63	294·07	294·52	294·96	295·40	295·84
·08	296·28	296·74	297·20	297·66	298·12	298·58	299·05	299·51	299·97	300·44
·09	300·90	301·39	301·88	302·38	302·87	303·37	303·87	304·37	304·86	305·36
·10	305·85	306·38	306·91	307·45	307·98	308·51	309·06	309·59	310·12	310·66
·11	311·19	311·77	312·36	312·94	313·53	314·11	314·71	315·29	315·88	316·46
·12	317·05	317·73	318·41	319·09	319·77	320·45	321·14	321·82	322·50	323·18
·13	323·86	324·70	325·55	326·39	327·24	328·08	328·93	329·77	330·62	331·47
·14	332·32	333·47	334·62	335·77	336·92	338·07	339·24	340·92	342·60	344·29
·150	346·67	346·90	347·13	347·36	347·60	347·99	348·38	348·77	349·16	349·55
·151	349·94	350·33	350·72	351·11	351·49	352·62	353·75	354·89		
+	9	8	7	6	5	4	3	2	1	0
·151	...	...	355·88	357·01	358·14	359·27	359·65	360·04	360·42	360·81
·150	361·20	361·59	361·98	362·37	362·76	363·15	363·39	363·62	363·85	364·08

e—EYE-TABLE FOR TITHIS.—(BRAHMA SIDDHĀNTA AND SIDDHĀNTA ŚIROMANI.)

Moon's anomaly and equation of the centre expressed in days and fractions of a day.

Eqn.	0	1	2	3	4	5	6	7	8	9
—	Moon's anomaly in days.									
·00	0·000	0·012	0·023	0·035	0·046	0·058	0·069	0·081	0·093	0·104
·01	0·116	0·127	0·139	0·151	0·162	0·174	0·186	0·198	0·209	0·221
·02	0·233	0·244	0·256	0·268	0·279	0·291	0·303	0·314	0·326	0·338
·03	0·349	0·361	0·373	0·388	0·396	0·408	0·419	0·431	0·443	0·454
·04	0·466	0·478	0·489	0·501	0·513	0·525	0·536	0·547	0·559	0·571
·05	0·582	0·594	0·606	0·617	0·629	0·641	0·653	0·664	0·676	0·688
·06	0·699	0·711	0·723	0·734	0·746	0·758	0·769	0·781	0·793	0·804
·07	0·816	0·827	0·839	0·851	0·863	0·874	0·886	0·898	0·910	0·922
·08	0·934	0·946	0·958	0·970	0·982	0·994	1·006	1·018	1·030	1·042
·09	1·054	1·066	1·078	1·090	1·102	1·114	1·126	1.138	1·150	1·162
·10	1·174	1·186	1·198	1·210	1·222	1·234	1·246	1·257	1·269	1·281
·11	1·293	1·305	1·317	1·329	1·341	1·353	1·365	1·377	1·389	1·401
·12	1·413	1·425	1·437	1·449	1·461	1·473	1·485	1·498	1·510	1·523
·13	1·535	1·548	1·560	1·573	1·585	1·598	1·610	1·623	1·635	1·648
.14	1·660	1·673	1·685	1·698	1·710	1·723	1·735	1·748	1·760	1·773
15	1·785	1·797	1·810	1·822	1·835	1·847	1·860	1·872	1·885	1·897
·16	1·910	1·922	1·935	1·947	1·960	1·972	1·985	1·997	2·010	2·022
·17	2·035	2·047	2·060	2·072	2·085	2·097	2·110	2·122	2·135	2·147
·18	2·160	2·172	2·185	2·197	2·210	2·223	2·236	2·249	2·262	2·275
·19	2·288	2·301	2·314	2·327	2·340	2·353	2·366	2·379	2·392	2·405
·20	2·418	2·431	2·442	2·457	2·470	2·483	2·496	2·509	2·522	2·535
·21	2·548	2·561	2·574	2·587	2·600	2·614	2·628	2·642	2·656	2·670
·22	2·684	2·698	2·712	2·726	2·740	2·754	2·767	2·781	2·795	2·809
·23	2·823	2·837	2·851	2·865	2·879	2·893	2·907	2·921	2·935	2·949
·24	2·963	2·977	2·991	3·005	3·019	3·033	3·047	3·061	3·075	3·089
·25	3·103	3·117	3·131	3·145	3·159	3·174	3·189	3·204	3·219	3·234
·26	3·249	3·264	3·279	3·294	3·309	3·324	3·339	3·354	3·369	3·384
·27	3·399	3·414	3·429	3·444	3·459	3·474	3·489	3·504	3·519	3·534
·28	3·549	3·564	3·580	3·596	3·612	3·628	3·644	3·660	3·676	3·692
29	3·708	6·724	3·740	3·756	3·772	3·788	3·804	3·820	3·837	3·854
·30	3·870	3·887	3·904	3·921	3·938	3·955	3·972	3·989	4·006	4·023
·31	4·040	4·057	4·075	4·093	4·111	4·129	4·147	4·165	4·183	4·201
·32	4·219	4·237	4·255	4·274	4·293	4·312	4·831	4·350	4·369	4·388
·33	4·407	4·426	4·445	4·464	4·483	4·502	4·521	4·540	4·559	4·578
·34	4·598	4·618	4·637	4·657	4·676	4·696	4·715	4·735	4·755	4·775
·35	4·795	4·815	4·835	4·855	4·875	4·895	4·916	4·938	4·959	4·981
·36	5·003	5·025	5·047	5·069	5·091	5·113	5·185	5·158	5·183	5·210
·37	5·238	5·266	5·294	5·322	5·350	5·378	5·406	5·434	5·462	5·490
38	5·519	5·548	5·577	5·607	5·637	5·667	5·697	5·727	5·757	5·787
·39	5·817	5·847	5·880	5·915	5·952	5·989	6·029	6·069	6·109	6·149
·400	6·190	6·194	6·198	6·202	6·206	6·210	6·214	6·219	6·224	6·229
·401	6·235	6·240	6·245	6·250	6·255	6·260	6·265	6·270	6·275	6·280
·402	6·286	6·291	6·296	6·301	6·306	6·311	6·316	6·321	6·326	6·331
·403	6·337	6·342	6·347	6·352	6·357	6·362	6·367	6·372	6·377	6·382
·404	6·388	6·393	6·398	6·403	6·408	6·418	6·418	6·423	6·428	6·433
·405	6·439	6·444	6·449	6·454	6·459	6·464	6·470	6·475	6·480	6·485
·406	6·491	6·495	6·501	6·506	6·511	6·516	6·521	6·526	6·531	6·536
·407	6·542	6·548	6·554	6·560	6·567	6·574	6·581	6·588	6·595	6·602
·408	6·610	6·617	6·624	6·631	6·638	6·645	6·652	6·659	6·666	6·673
·409	6·681	6·688	6·695	6·702	6·709	6·716	6·723	6·733	6·743	6·753
·410	6·764	6·775	6·786	6·797	6·808	6·819	6·830	6·841	6·852	6·863
·411	6·875	6·886	6·897	6·908	6·919	6·930	6·941	6·952	6·963	6·974
·412	6·986	6·997	7·015	7·050	7·086	7·122	7·158	7·194	7·230	7·266
413	7·303	...	...	...	...	...	...	...	...	...

Eqn.	9	8	7	6	5	4	3	2	1	0
—	Moon's anomaly in days.									
·413	...	...		...	...	..	...	...	...	7·301
·412	7·337	7·373	7·409	7·444	7·480	7·516	7·552	7·587	7·605	7·616
·411	7·627	7·638	7·649	7·660	7·670	7·681	7·692	7·703	7·714	7·725
·410	7·736	7·747	7·758	7·769	7·779	7·790	7·801	7·812	7·823	7·834
·409	7·844	7·854	7·864	7·874	7·880	7·887	7·894	7·901	7·908	7·915
·408	7·922	7·929	7·936	7·943	7·949	7·956	7·963	7·970	7·977	7·984
·407	7·991	7·998	8·005	8·012	8·018	8·025	8·032	8·038	8·044	8·050
·406	8·055	8·060	8·065	8·069	8·074	8·079	8·084	8·089	8·094	8·099
·405	8·104	8·109	8·114	8·119	8·123	8·128	8·133	8·138	8·143	8·148
·404	8·153	8·157	8·162	8·167	8·172	8·177	8·182	8·187	8·192	8·197
·403	8·202	8·206	8·211	8·216	8·221	8·226	8·231	8·236	8·241	8·246
·402	8·250	8·255	8·260	8·265	8·270	8·275	8·280	8·285	8·290	8·295
·401	8·300	8·305	8·309	8·314	8·319	8·324	8·329	8·334	8·339	8·344
·400	8·349	8·354	8·358	8·364	8·367	8·371	8·375	8·379	8·383	8·387
·39	8·425	8·464	8·502	8·540	8·578	8·613	8·648	8·681	8·712	8·740
·38	8·768	8·796	8·824	8·852	8·880	8·908	8·936	8·964	8·991	9·018
·37	9·045	9·071	9·097	9·123	9·149	9·175	9·201	9·227	9·253	9·279
·36	9·305	9·330	9·353	9·373	9·394	9·414	9·434	9·454	9·474	9·494
·35	9·514	9·534	9·553	9·573	9·592	9·610	9·628	9·646	9·664	9·682
·34	9·700	9·718	9·736	9·754	9.771	9·789	9·808	9·824	9·841	9·859
33	9·877	9·894	9·911	9·928	9·945	9·962	9·979	9.996	10·013	10·030
·32	10·047	10·064	10·081	10·098	10·115	10·132	10·149	10·166	10·182	10·198
·31	10·214	10·230	10·246	10·262	10·278	10·294	10·310	10·326	10·342	10·357
·30	10·372	10·387	10·402	10·417	10·432	10·447	10·462	10·477	10·492	10·507
·29	10·521	10·536	10·551	10·565	10·579	10·593	10·607	10·621	10·635	10·649
·28	10·663	10·677	10·691	10·705	10·719	10·733	10·747	10·761	10·775	10·788
·27	10·801	10·814	10·827	10·840	10·853	10·866	10·879	10·892	10·905	10·918
·26	10·931	10·944	10·957	10·970	10·983	10·996	11·009	11·022	11·035	11·048
·25	11·061	11·074	11·087	11·100	11·118	11·126	11·138	11·150	11·162	11·174
·24	11·186	11·198	11·210	11·222	11·234	11·246	11·258	11·270	11·282	11·294
·23	11·306	11·318	11·330	11·342	11·354	11·366	11·378	11·390	11·402	11·414
·22	11·426	11·438	11·450	11·462	11·473	11·485	11·497	11·509	11·521	11·533
·21	11·545	11·557	11·569	11·581	11·593	11·605	11·616	11·627	11·638	11·649
·20	11·660	11·671	11·682	11·693	11·704	11·715	11·726	11·737	11·748	11·759
·19	11·770	11·781	11·792	11·803	11·814	11·825	11·836	11·847	11·858	11·869
·18	11·880	11·891	11·902	11·913	11·924	11·935	11·946	11·956	11·967	11·977
·17	11·988	11·998	12·009	12·020	12·030	12·040	12·051	12·061	12·071	12·082
·16	12·093	12·103	12·114	12·124	12·135	12·145	12·156	12·166	12·177	12·187
·15	12·198	12·208	12·219	12·229	12·240	12·250	12·261	12·271	12·282	12·292
·14	12·302	12·313	12·323	12·334	12·344	12·355	12·365	12·376	12·386	12·397
13	12·407	12·418	12·428	12·439	12·449	12·460	12·470	12·481	12·491	12·502
·12	12·512	12·523	12·533	12·544	12·554	12·564	12·574	12·584	12·594	12·604
·11	12·614	12·624	12·634	12·644	12·654	12·664	12·674	12·684	12·694	12·704
·10	12·714	12·724	12·734	12·743	12·753	12·763	12·773	12·783	12·793	12·803
09	12·813	12·823	12·833	12·843	12·853	12·863	12·873	12·883	12·893	12·903
·08	12·913	12·923	12·933	12·943	12·953	12·963	12·973	12·983	12·993	13·003
·07	13·013	13·023	13·033	13·043	13·053	13·062	13·072	13·082	13·091	13·101
·06	13·111	13·120	13·130	13·140	13·149	13·159	13·169	13·178	13·188	13·198
·05	13·207	13·217	13·227	13·236	13·246	13·256	13·266	13·275	13·285	13·295
04	13·304	13·314	13·324	13·333	13·342	13·352	13·362	13·372	13·381	13·391
·03	13·401	13·410	13·420	13·430	13·439	13·449	13·459	13·468	13·478	13·488
·02	13·497	13·507	13·517	13·526	13·536	13·546	13·555	13·565	13·575	13·584
·01	13·594	13·604	13·613	13·623	13·633	13·643	13·652	13·662	13·671	13·681
·00	13·691	13·700	13·710	13·720	13·729	13·738	13·748	13·758	13·767	13·777

Θ—EYE-TABLE FOR TITHIS—(BRAHMA SIDDHÂNTA AND SIDDHÂNTA ŚIROMANI)—*continued.*

Moon's anomaly and equation of the centre expressed in days and fractions of a day.

Eqn. +	0	1	2	3	4	5	6	7	8	9	Eqn. +	9	8	7	6	5	4	3	2	1	0
	Moon's anomaly in days.											Moon's anomaly in days.									
·00	13·777	13·787	13·796	13·806	13·815	13·825	13·834	13·844	13·854	13·863	·413	...	...	...	...	...	...	...	...	...	20·253
·01	13·873	13·882	13·892	13·902	13·911	13·921	13·931	13·941	13·950	13·960	·412	20·288	20·324	20·360	20·426	20·463	20·499	20·535	20·540	20·558	20·569
·02	13·970	13·979	13·989	13·999	14·008	14·018	14·028	14·037	14·047	14·057	·411	20·580	20·591	20·602	20·613	20·625	20·636	20·647	20·658	20·669	20·680
·03	14·066	14·076	14·086	14·095	14·105	14·115	14·124	14·134	14·144	14·153	·410	20·691	20·702	20·713	20·724	20·736	20·747	20·758	20·769	20·780	20·791
·04	14·163	14·173	14·182	14·192	14·202	14·212	14·221	14·230	14·240	14·250	·409	20·801	20·811	20·821	20·831	20·839	20·846	20·853	20·860	20·867	20·874
·05	14·259	14·269	14·279	14·288	14·298	15·308	14·318	14·327	14·337	14·347	·408	20·881	20·888	20·895	20·902	20·910	20·917	20·924	20·931	20·938	20·945
·06	14·356	14·366	14·376	14·385	14·395	14·405	14·414	14·424	14·434	14·443	·407	20·952	20·959	20·966	20·973	20·981	20·988	20·995	21·001	21·007	21·013
·07	14·453	14·463	14·472	14·482	14·492	14·501	14·511	14·521	14·531	14·541	·406	21·018	21·023	21·028	21·033	21·039	21·044	21·049	21·054	21·059	21·064
·08	14·551	14·561	14·571	14·581	14·591	14·601	14·611	14·621	14·631	14·641	·405	21·069	21·074	21·079	21·086	21·090	21·095	21·100	21·105	21·110	21·115
·09	14·651	14·661	14·671	14·681	14·691	14·701	14·711	14·721	14·731	14·741	·404	21·120	21·125	21·130	21·135	21·141	21·146	21·151	21·156	21·161	21·166
·10	14·751	14·761	14·771	14·781	14·791	14·801	14·811	14·820	14·830	14·840	·403	21·171	21·176	21·181	21·186	21·192	21·197	21·202	21·207	21·212	21·217
·11	14·850	14·860	14·870	14·880	14·890	14·900	14·910	14·920	14·930	14·940	·402	21·222	21·227	21·232	21·237	21·243	21·248	21·253	21·258	21·263	21·268
·12	14·950	14·960	14·970	14·980	14·990	15·000	15·010	15·021	15·031	15·042	401	21·273	21·278	21·283	21·288	21·294	21·299	21·304	21·309	21·314	21·319
·13	15·052	15·063	15·073	15·084	15·094	15·105	15·115	15·126	15·136	15·147	·400	21·324	21·329	21·334	21·339	21·344	21·348	21·352	21·356	21·360	21·364
14	15·157	15·168	15·178	15·189	15·199	15·210	15·220	15·231	15·241	15·252	·39	21·404	21·445	21·485	21·526	21·565	21·602	21·639	21·674	21·707	21·737
·15	15·262	15·272	15·283	15·293	15·304	15·314	15·325	15·335	15·346	15·356	·38	21·767	21·797	21·827	21·857	21·887	21·917	21·947	21·977	22·006	22·035
·16	15·367	15·377	15·388	15·398	15·409	15·419	15·430	15·440	15·451	15·461	·37	22·064	22·092	22·120	22·148	22·176	22·204	22·232	22·260	22·288	22·316
·17	15·472	15·482	15·493	15·503	15·514	15·524	15·535	15·545	15·556	15·566	·36	22·344	22·371	22·396	22·419	22·441	28·463	22·485	22·507	22·529	22·551
·18	15·577	15·587	15·598	15·608	15·619	15·630	15·641	15·652	15·663	15·674	·35	22·573	22·595	22·616	22·638	22·659	22·679	22·699	22·719	22·739	22·759
·19	15·685	15·696	15·707	15·718	15·729	15·740	15·751	15·762	15·773	15·784	·34	22·779	22·799	22·819	22·839	22·858	22·878	22·897	22·917	22·936	22·956
·20	15·795	15·805	15·817	15·828	15·839	15·850	15·861	15·872	15·883	15·894	·33	22·976	22·995	23·014	23·033	23·052	23·071	23·090	23·109	23·128	23·147
·21	15·905	15·916	15·927	15·938	15·949	15·961	15·973	15·985	15·997	16·009	·32	23·166	23·185	23·204	23·223	23·242	23·261	23·280	23·299	23·317	23·335
·22	16·021	16·033	16·045	16·057	16·069	16·081	16·092	16·104	16·116	16·128	31	23·353	23·371	23·389	23·407	23·425	23·443	23·461	23·479	23·497	23·514
·23	16·140	16·152	16·164	16·176	16·188	16·200	16·212	16·224	16·236	16·248	·30	23·531	23·548	23·565	23·582	23·599	23·616	23·633	23·650	23·667	23·684
·24	16·260	16·272	16·284	16·296	16·308	16·320	16·332	16·344	16·356	16·368	29	23·700	23·717	23·734	23·750	23·766	23·782	23·798	23·814	23·830	23·846
25	16·380	16·392	16·404	16·416	16·428	16·441	16·454	16·467	16·480	16·493	·28	23·862	23·878	23·894	23·910	23·926	23·942	23·958	23·974	23·990	24·005
·26	16·506	16·519	16·532	16·545	16·558	16·571	16·584	16·597	16·610	16·623	·27	24·020	24·035	24·050	24·065	24·080	24·095	24·110	24·125	24·140	24·155
·27	16·636	16·649	16·662	16·675	16·688	16·701	16·714	16·727	16·740	16·753	26	24·170	24·185	24·200	24·215	24·230	24·245	24·260	24·275	24·290	24·305
·28	16·766	16·777	16·793	16·807	16·821	16·835	16·849	16·863	16·877	16·891	25	24·320	24·335	24·350	24·365	24·380	24·395	24·409	24·423	24·437	24·451
·29	16·905	16·919	16·933	16·947	16·961	16·975	16·989	17·003	17·018	17·033	·24	24·465	24·479	24·493	24·507	24·521	24·535	24·549	24·563	24·577	24·591
30	17·047	17·062	17·077	17·092	17·107	17·122	17·137	17·152	17·167	17·182	·23	24·605	24·619	24·633	24·647	24·661	24·675	24·689	24·703	24·717	24·731
·31	17·197	17·212	17·228	17·244	17·260	17·276	17·292	17·308	17·324	17·340	22	24·745	24·759	24·773	24·787	24·801	24·814	24·828	24·842	24·856	24·870
·32	17·356	17·372	17·388	17·405	17·422	17·439	17·456	17·473	17·490	17·507	·21	24·884	24·898	24·912	24·926	24·940	24·954	24·968	24·980	24·993	25·006
33	17·524	17·541	17·558	17·575	17·592	16·609	17·626	17·643	17·660	17·677	20	25·019	25·032	25·045	25·058	25·071	25·084	25·097	25·110	25·123	25·136
·34	17·695	17·713	17·730	17·748	17·765	17·783	17·800	17·818	17·836	17·854	·19	25·149	25·162	25·175	25·188	25·201	25·214	25·227	25·240	25·253	25·266
·35	17·868	17·890	17·908	17·926	17·944	17·962	17·981	18·001	18·020	18·040	·18	25·279	25·292	25·305	25·318	25·331	25·344	25·357	25·369	25·382	25·394
·36	18·060	18·080	18·100	18·120	18·140	18·160	18·180	18·201	18·224	18·249	17	25·407	25·419	25·432	25·445	25·457	25·469	25·482	25·494	25·507	25·519
·37	18·275	18·301	18·327	18·353	18·379	18·405	18·431	18·457	18·483	18·509	·16	25·532	25·544	25·557	25·569	25·582	25·594	25·607	25·619	25·632	25·644
·38	18·536	18·563	18·590	18·618	18·646	18·674	18·702	18·730	18·758	18·786	·15	25·657	25·669	25·682	25·694	25·707	25·719	25·732	25·744	25·757	25·769
·39	18·814	18·842	18·873	18·906	18·941	18·976	19·014	19·052	19·090	19·128	·14	25·781	25·794	25·806	25·819	25·831	25·844	25·856	25·869	25·881	25·894
·400	19·167	19·171	19·175	19·179	19·183	19·187	19·191	19·196	19·201	19·206	13	25·906	25·919	25·931	25·944	25·956	25·969	25·981	25·994	26·000	26·019
401	19·210	19·215	19·220	19·225	19·230	19·235	19·240	19·245	19·250	19·255	·12	26·031	26·044	26·056	26·069	26·081	26·093	26·105	26·117	26·129	26·141
·402	19·259	19·264	19·269	19·274	19·279	19·284	19·289	19·294	19·299	19·304	·11	26·153	26·165	26·177	26·189	26·201	26·213	26·225	26·237	26·249	26·261
·403	19·308	19·313	19·318	19·323	19·328	19·333	19·338	19·343	19·348	19·353	·10	26·273	26·285	26·297	26·308	26·320	26·332	26·344	26·356	26·368	26·380
·404	19·357	19·362	19·367	19·372	19·377	19·382	19·387	19·392	19·397	19·402	09	26·392	26·404	26·416	26·428	26·440	26·452	26·464	26·476	26·488	26·500
·405	19·406	19·411	19·416	19·421	19·426	19·431	19·435	19·440	19·445	19·450	·08	26·512	26·524	26·536	26·548	26·560	26·572	26·584	26·596	26·608	26·620
·406	19·455	19·460	19·465	19·470	19·475	19·480	19·484	19·489	19·494	19·499	·07	26·632	26·644	26·656	26·668	26·680	26·691	26·703	26·715	26·726	26·738
·407	19·504	19·510	19·516	19·522	19·529	19·536	19·542	19·549	19·556	19·563	06	26·750	26·761	26·773	26·785	26·796	26·808	26·820	26·831	26·843	26·855
·408	19·570	19·577	19·586	19·591	19·598	19·605	19·611	19·618	19·625	19·632	·05	26·866	26·878	26·890	26·901	26·913	26·925	26·937	26·948	26·960	26·972
·409	19·639	19·646	19·653	19·660	19·667	19·674	19·650	19·690	19·700	19·710	·04	26·983	26·995	27·007	27·018	27·029	27·041	27·053	27·065	27·076	27·088
·410	19·720	19·731	19·741	19·752	19·763	19·774	19·785	19·796	19·807	19·818	·03	27·100	27·111	27·123	27·135	27·146	27·158	27·170	27·181	27·193	27·205
411	19·829	19·840	19·851	19·862	19·873	19·884	19·894	19·905	19·916	19·927	·02	27·216	27·228	27·240	27·251	27·263	27·275	27·286	27·298	27·310	27·321
.412	19·938	19·949	19·967	20·002	20·038	20·074	20·109	20·145	20·181	20·217	·01	27·333	27·345	27·356	27·368	27·380	27·392	27·403	27·415	27·427	27·438
·413	20·253	...	...	...	...	...	...	...	...	...	·00	27·450	27·461	27·473	27·485	27·496	27·507	27·519	27·531	27·542	27·554

f—EYE-TABLE FOR NAKSHATRAS.

Moon's anomaly and moon's equation of the centre in days and fractions of a day.

(BRAHMA SIDDHĀNTA AND SIDDHĀNTA ŚIROMANI.)

Eqn.	0	1	2	3	4	5	6	7	8	9
—	Moon's anomaly in days.									
·00	0·000	0·012	0·025	0·037	0·050	0·062	0·075	0·087	0·100	0·112
·01	0·125	0·137	0·150	0·162	0·175	0·187	0·200	0·212	0·225	0·237
·02	0·250	0·262	0·275	0·287	0·300	0·312	0·325	0·337	0·350	0·362
·03	0·375	0·387	0·400	0·412	0·425	0·437	0·450	0·462	0·475	0·487
·04	0·499	0·512	0·524	0·537	0·549	0·562	0·574	0·587	0·599	0·612
·05	0·624	0·637	0·649	0·662	0·674	0·687	0·699	0·712	0·726	0·737
·06	0·749	0·762	0·774	0·787	0·799	0·812	0·824	0·837	0·849	0·862
·07	0·874	0·887	0·899	0·912	0·924	0·937	0·950	0·963	0·976	0·989
·08	1·002	1·015	1·028	1·041	1·054	1·067	1·080	1·093	1·106	1·119
·09	1·132	1·145	1·158	1·171	1·184	1·197	1·210	1·223	1·236	1·249
·10	1·262	1·275	1·288	1·301	1·314	1·327	1·340	1·353	1·366	1·379
·11	1·392	1·405	1·418	1·431	1·444	1·457	1·470	1·483	1·496	1·509
·12	1·522	1·535	1·548	1·561	1·575	1·588	1·601	1·615	1·628	1·642
·13	1·655	1·669	1·682	1·694	1·708	1·722	1·736	1·749	1·763	1·776
·14	1·789	1·802	1·816	1·829	1·842	1·856	1·869	1·883	1·896	1·910
·15	1·923	1·937	1·950	1·964	1·978	1·991	2·005	2·018	2·032	2·045
·16	2·059	2·072	2·086	2·099	2·112	2·126	2·139	2·153	2·166	2·180
·17	2·193	2·207	2·221	2·234	2·248	2·262	2·276	2·291	2·305	2·318
·18	2·332	2·346	2·360	2·374	2·388	2·402	2·416	2·430	2·444	2·458
·19	2·472	2·486	2·500	2·514	2·528	2·542	2·555	2·570	2·584	2·598
·20	2·613	2·628	2·643	2·658	2·673	2·688	2·703	2·718	2·734	2·748
·21	2·763	2·779	2·794	2·809	2·823	2·838	2·853	2·868	2·883	2·898
·22	2·912	2·928	2·943	2·958	2·973	2·988	3·003	3·018	3·034	3·049
·23	3·065	3·080	3·096	3·111	3·127	3·142	3·158	3·173	3·189	3·204
·24	3·220	3·235	3·251	3·266	3·282	3·298	3·314	3·331	3·348	3·365
·25	3·381	3·397	3·413	3·429	3·445	3·461	3·477	3·493	3·509	3·525
·26	3·541	3·558	3·576	3·593	3·610	3·627	3·644	3·661	3·678	3·695
·27	3·713	3·731	3·749	3·767	3·784	3·802	3·819	3·837	3·854	3·871
·28	3·889	3·906	3·924	3·942	3·961	3·980	3·999	4·018	4·037	4·056
·29	4·075	4·094	4·113	4·131	4·150	4·169	4·188	4·208	4·229	4·248
·30	4·269	4·289	4·310	4·330	4·351	4·371	4·392	4·413	4·434	4·455
·31	4·476	4·497	4·518	4·539	4·560	4·581	4·602	4·623	4·644	4·665
·32	4·686	4·707	4·729	4·751	4·773	4·795	4·817	4·839	4·861	4·883
·33	4·905	4·927	4·950	4·973	4·996	5·020	5·044	5·068	5·092	5·117
·34	5·148	5·180	5·211	5·243	5·274	5·306	5·337	5·369	5·401	5·433
·35	5·465	5·497	5·529	5·561	5·593	5·625	5·657	5·689	5·722	5·756
·36	5·790	5·825	5·862	5·899	5·936	5·973	6·010	6·047	6·084	6·121
·370	6·158	6·163	6·168	6·173	6·178	6·183	6·189	6·194	6·199	6·204
·371	6·209	6·214	6·219	6·225	6·229	6·234	6·239	6·244	6·249	6·254
·372	6·259	6·264	6·270	6·276	6·282	6·287	6·293	6·299	6·305	6·311
·373	6·317	6·323	6·329	6·335	6·341	6·346	6·352	6·357	6·363	6·368
·374	6·373	6·379	6·384	6·390	6·395	6·400	6·407	6·412	6·418	6·423
·375	6·429	6·434	6·439	6·445	6·451	6·456	6·462	6·467	6·473	6·478
·376	6·483	6·489	6·494	6·500	6·505	6·511	6·518	6·524	6·531	6·538
·377	6·545	6·552	6·560	6·567	6·575	6·583	6·593	6·601	6·609	6·617
·378	6·625	6·633	6·640	6·648	6·656	6·663	6·671	6·678	6·685	6·692
·379	6·702	6·713	6·725	6·736	6·748	6·760	6·773	6·784	6·796	6·808
·380	6·821	6·833	6·845	6·857	6·869	6·881	6·894	6·906	6·918	6·931
·381	6·944	6·957	6·970	6·985	7·015	7·051	7·088	7·124	7·160	7·196
·382	7·232	7·268	...	...	...	...	...	...	...	...

Eqn.	9	8	7	6	5	4	3	2	1	0
—	Moon's anomaly in days.									
·382									7·273	7·309
·381	7·345	7·381	7·417	7·450	7·488	7·524	7·555	7·569	7·582	7·595
·380	7·608	7·621	7·633	7·645	7·656	7·668	7·680	7·692	7·704	7·716
·379	7·729	7·741	7·753	7·764	7·775	7·787	7·799	7·810	7·822	7·833
·378	7·843	7·850	7·857	7·864	7·870	7·874	7·885	7·893	7·900	7·908
·377	7·916	7·924	7·932	7·940	7·948	7·956	7·964	7·971	7·979	7·986
·376	7·993	8·000	8·006	8·012	8·017	8·023	8·028	8·034	8·039	8·045
·375	8·050	8·055	8·061	8·066	8·070	8·075	8·081	8·087	8·092	8·097
·374	8·103	8·108	8·114	8·119	8·124	8·129	8·134	8·140	8·145	8·151
·373	8·156	8·161	8·167	8·172	8·176	8·181	8·187	8·193	8·199	8·205
·372	8·211	8·217	8·223	8·229	8·233	8·238	8·243	8·248	8·254	8·259
·371	8·264	8·269	8·274	8·279	8·284	8·289	8·294	8·299	8·304	8·309
·370	8·314	8·319	8·324	8·329	8·333	8·338	8·343	8·348	8·353	8·358
·36	8·393	8·428	8·463	8·498	8·533	8·568	8·603	8·638	8·675	8·708
·35	8·740	8·772	8·803	8·833	8·863	8·893	8·923	8·953	8·983	9·013
·34	9·043	9·073	9·103	9·133	9·162	9·192	9·221	9·251	9·280	9·310
·33	9·339	9·362	9·384	9·406	9·428	9·450	9·471	9·492	9·513	9·533
·32	9·553	9·573	9·593	9·613	9·633	9·653	9·673	9·693	9·713	9·732
·31	9·751	9·770	9·789	9·808	9·827	9·846	9·865	9·884	9·903	9·922
·30	9·941	9·960	9·979	9·998	10·017	10·035	10·054	10·072	10·091	10·109
·29	10·128	10·146	10·165	10·183	10·200	10·217	10·234	10·250	10·267	10·284
·28	10·301	10·318	10·335	10·352	10·369	10·386	10·403	10·419	10·435	10·450
·27	10·466	10·481	10·496	10·512	10·527	10·543	10·560	10·574	10·590	10·606
·26	10·622	10·637	10·652	10·667	10·632	10·697	10·712	10·725	10·741	10·756
·25	10·770	10·784	10·798	10·812	10·826	10·840	10·854	10·868	10·882	10·896
·24	10·910	10·925	10·940	10·955	10·969	10·983	10·997	11·010	11·024	11·037
·23	11·051	11·064	11·078	11·091	11·105	11·118	11·132	11·145	11·159	11·172
·22	11·186	11·199	11·213	11·226	11·239	11·252	11·265	11·278	11·291	11·305
·21	11·318	11·330	11·343	11·356	11·369	11·382	11·395	11·408	11·421	11·434
·20	11·447	11·460	11·473	11·486	11·499	11·512	11·525	11·538	11·551	11·564
·19	11·577	11·588	11·601	11·614	11·625	11·637	11·649	11·661	11·673	11·685
·18	11·697	11·709	11·720	11·733	11·745	11·757	11·769	11·781	11·793	11·805
·17	11·817	11·828	11·840	11·853	11·865	11·877	11·889	11·900	11·912	11·924
·16	11·935	11·947	11·959	11·971	11·982	11·994	12·005	12·016	12·028	12·039
·15	12·051	12·062	12·074	12·085	12·097	12·108	12·120	12·132	12·143	12·155
·14	12·166	12·178	12·189	12·201	12·213	12·225	12·236	12·247	12·259	12·270
·13	12·281	12·292	12·304	12·315	12·327	12·338	12·349	12·361	12·372	12·384
·12	12·395	12·407	12·418	12·430	12·441	12·452	12·464	12·475	12·486	12·497
·11	12·508	12·519	12·530	12·541	12·552	12·563	12·574	12·585	12·596	12·607
·10	12·618	12·629	12·640	12·651	12·662	12·673	12·684	12·695	12·706	12·717
·09	12·728	12·739	12·750	12·761	12·772	12·783	12·794	12·805	12·816	12·827
·08	12·838	12·849	12·860	12·871	12·882	12·893	12·904	12·915	12·926	12·937
·07	12·948	12·959	12·970	12·981	12·992	13·003	13·013	13·024	13·034	13·045
·06	13·055	13·066	13·076	13·087	13·097	13·108	13·118	13·129	13·139	13·150
·05	13·160	13·171	13·181	13·192	13·202	13·213	13·223	13·234	13·244	13·255
·04	13·265	13·276	13·286	13·297	13·307	13·318	13·328	13·339	13·349	13·360
·03	13·370	13·380	13·391	13·401	13·412	13·422	13·433	13·443	13·454	13·464
·02	13·475	13·485	13·496	13·506	13·517	13·527	13·538	13·548	13·558	13·569
·01	13·580	13·590	13·600	13·610	13·620	13·630	13·641	13·651	13·662	13·672
·00	13·683	13·693	13·704	13·714	13·725	13·735	13·746	13·756	13·767	13·777

f—EYE-TABLE FOR NAKSHATRAS—*continued.*

Moon's anomaly and moon's equation of the centre in days and fractions of a day.

(BRAHMA SIDDHĀNTA AND SIDDHĀNTA ŚIROMANI)

Eqn. +	0	1	2	3	4	5	6	7	8	9	Eqn. +	9	8	7	6	5	4	3	2	1	0
	Moon's anomaly in days.											Moon's anomaly in days									
·00	13·777	13·787	13·798	13·808	13·819	13·829	13·840	13·850	13·861	13·871	·382	...	...	...	...	...	...	...	...	20·286	20·322
·01	13·882	13·892	13·903	13·918	13·924	13·934	13·944	13·954	13·964	13·974	·381	20·358	20·394	20·430	20·463	20·503	20·539	20·570	20·584	20·597	20·610
·02	13·985	13·995	14·006	14·016	14·027	14·037	14·048	14·058	14·069	14·079	·380	20·623	20·636	20·648	20·660	20·673	20·685	20·697	20·709	20·721	20·733
·03	14·090	14·100	14·111	14·121	14·132	14·142	14·153	14·163	14·174	14·184	·379	20·746	20·758	20·770	20·781	20·794	20·806	20·818	20·829	20·841	20·852
·04	14·194	14·205	14·215	14·226	14·236	14·247	14·257	14·268	14·278	14·289	·378	20·862	20·869	20·876	20·883	20·891	20·898	20·906	20·914	20·921	20·929
·05	14·299	14·310	14·320	14·331	14·341	14·352	14·362	14·373	14·383	14·394	·377	20·937	20·945	20·953	20·961	20·971	20·979	20·987	20·994	21·002	21·009
·06	14·404	14·415	14·426	14·437	14·447	14·458	14·468	14·479	14·489	14·500	·376	21·016	21·023	21·029	21·035	21·042	21·048	21·053	21·059	21·064	21·070
·07	14·510	14·521	14·531	14·542	14·552	14·563	14·574	14·585	14·596	14·607	·375	21·075	21·080	21·086	21·091	21·097	21·102	21·108	21·114	21·119	21·124
·08	14·618	14·629	14·640	14·651	14·662	14·673	14·684	14·695	14·706	14·717	·374	21·130	21·135	21·141	21·146	21·153	21·158	21·163	21·169	21·174	21·180
·09	14·728	14·739	14·750	14·761	14·772	14·783	14·794	14·805	14·816	14·827	·373	21·185	21·190	21·196	21·201	21·207	21·212	21·218	21·224	21·230	21·236
·10	14·838	14·849	14·860	14·871	14·882	14·893	14·904	14·915	14·926	14·937	·372	21·242	21·248	21·254	21·260	21·266	21·271	21·277	21·283	21·289	21·294
·11	14·948	14·959	14·970	14·981	14·992	15·003	15·014	15·025	15·036	15·047	·371	21·299	21·304	21·309	21·314	21·319	21·324	21·329	21·334	21·339	21·344
·12	15·059	15·070	15·081	15·092	15·104	15·115	15·126	15·138	15·149	15·161	·370	21·349	21·354	21·359	21·364	21·370	21·375	21·380	21·385	21·390	21·395
·13	15·172	15·184	15·195	15·207	15·218	15·229	15·241	15·252	15·264	15·275	·36	21·432	21·469	21·506	21·543	21·580	21·617	21·654	21·691	21·730	21·765
·14	15·286	15·297	15·309	15·320	15·331	15·343	15·354	15·366	15·377	15·389	·35	21·799	21·833	21·866	21·898	21·930	21·962	21·994	22·026	22·048	22·090
·15	15·400	15·412	15·423	15·435	15·447	15·458	15·470	15·481	15·493	15·504	·34	22·122	22·154	22·186	22·218	22·249	22·281	22·312	22·344	22·375	22·407
·16	15·516	15·527	15·539	15·550	15·561	15·573	15·584	15·596	15·607	15·619	·33	22·438	22·463	22·487	22·511	22·535	22·559	22·582	22·605	22·628	22·650
·17	15·630	15·642	15·654	15·665	15·677	15·689	15·701	15·714	15·726	15·737	·32	22·672	22·694	22·716	22·738	22·760	22·782	22·804	22·826	22·848	22·869
·18	15·749	15·761	15·773	15·785	15·797	15·809	15·821	15·833	15·845	15·857	·31	22·890	22·911	22·932	22·953	22·974	22·995	23·016	23·037	23·058	23·079
·19	15·869	15·881	15·893	15·905	15·917	15·929	15·940	15·953	15·966	15·977	·30	23·100	23·121	23·142	23·163	23·184	23·204	23·225	23·245	23·266	23·286
·20	15·990	16·003	16·016	16·029	16·042	16·055	16·068	16·081	16·094	16·107	·29	23·307	23·327	23·348	23·368	23·387	23·406	23·425	23·443	23·462	23·481
·21	16·120	16·134	16·147	16·160	16·173	16·186	16·199	16·212	16·225	16·237	·28	23·500	23·519	23·538	23·557	23·576	23·595	23·614	23·632	23·650	23·667
·22	16·250	16·264	16·277	16·290	16·303	16·316	16·329	16·342	16·356	16·369	·27	23·685	23·702	23·719	23·733	23·754	23·772	23·791	23·807	23·825	23·848
·23	16·383	16·396	16·410	16·423	16·437	16·450	16·464	16·477	16·491	16·504	·26	23·861	23·878	23·895	23·912	23·929	23·946	23·963	23·978	23·996	24·013
·24	16·518	16·531	16·545	16·558	16·572	16·586	16·600	16·615	16·630	16·645	·25	24·029	24·045	24·061	24·077	24·093	24·109	24·125	24·141	24·157	24·173
·25	16·659	16·673	16·687	16·701	16·715	16·729	16·743	16·757	16·771	16·785	·24	24·189	24·206	24·223	24·240	24·256	24·272	24·288	24·303	24·319	24·334
·26	16·799	16·814	16·830	16·845	16·860	16·875	16·890	16·905	16·920	16·935	·23	24·350	24·365	24·381	24·396	24·412	24·427	24·443	24·458	24·474	24·489
·27	16·949	16·967	16·983	16·999	17·014	17·030	17·045	17·061	17·076	17·091	·22	24·505	24·520	24·536	24·551	24·566	24·581	24·596	24·611	24·626	24·642
·28	17·107	17·122	17·138	17·154	17·171	17·188	17·205	17·222	17·239	17·255	·21	24·657	24·671	24·686	24·701	24·716	24·731	24·746	24·761	24·776	24·791
·29	17·273	17·290	17·307	17·323	17·340	17·357	17·374	17·392	17·411	17·428	·20	24·806	24·821	24·836	24·851	24·866	24·881	24·897	24·911	24·926	24·941
·30	17·447	17·465	17·484	17·502	17·521	17·539	17·558	17·577	17·596	17·615	·19	24·956	24·969	24·984	24·999	25·012	25·026	25·040	25·054	25·068	25·082
·31	17·634	17·653	17·672	17·691	17·710	17·729	17·748	17·767	17·786	17·805	·18	25·096	25·110	25·123	25·138	25·152	25·166	25·180	25·195	25·208	25·222
·32	17·824	17·843	17·863	17·883	17·903	17·923	17·943	17·963	17·983	18·003	·17	25·236	25·249	25·263	25·278	25·292	25·306	25·320	25·333	25·347	25·361
·33	18·023	18·043	18·064	18·085	18·106	18·127	18·149	18·171	18·193	18·216	·16	25·374	25·388	25·402	25·416	25·429	25·443	25·456	25·469	25·483	25·496
·34	18·245	18·275	18·304	18·334	18·363	18·393	18·422	18·452	18·482	18·512	·15	25·510	25·523	25·537	25·550	25·564	25·577	25·591	25·605	25·618	25·632
·35	18·542	18·572	18·602	18·632	18·662	18·692	18·722	18·752	18·783	18·815	·14	25·645	25·659	25·672	25·686	25·700	25·714	25·727	25·740	25·754	25·767
·36	18·847	18·880	18·915	18·950	18·985	19·020	19·055	19·090	19·125	19·160	·13	25·780	25·793	25·807	25·820	25·834	25·847	25·860	25·874	25·887	25·901
·370	19·195	19·200	19·205	19·210	19·215	19·220	19·224	19·229	19·234	19·239	·12	25·914	25·928	25·941	25·955	25·968	25·981	25·995	26·008	26·021	26·034
·371	19·244	19·249	19·254	19·259	19·264	19·269	19·274	19·279	19·284	19·289	·11	26·047	26·060	26·073	26·086	26·099	26·112	26·125	26·138	26·151	26·164
·372	19·294	19·299	19·304	19·309	19·315	19·320	16·324	19·330	19·336	19·342	·10	26·177	26·190	26·203	26·216	26·229	26·242	26·255	26·268	26·281	26·294
·373	19·348	19·354	19·360	19·366	19·372	19·377	19·381	19·386	19·392	19·397	·09	26·307	26·320	26·333	26·346	26·359	26·372	26·385	26·398	26·411	26·424
·374	19·402	19·408	19·413	19·419	19·424	19·429	19·434	19·439	19·445	19·450	·08	26·437	26·450	26·463	26·476	26·489	26·502	26·515	26·528	26·539	26·554
·375	19·456	19·461	19·466	19·472	19·478	19·483	19·487	19·492	19·498	19·503	·07	26·567	26·580	26·593	26·606	26·619	26·632	26·644	26·657	26·669	26·682
·376	19·508	19·514	19·519	19·525	19·530	19·536	19·541	19·547	19·554	19·561	·06	26·694	26·707	26·719	26·732	26·744	26·757	26·769	26·782	26·794	26·807
·377	19·568	19·575	19·583	19·590	19·598	19·606	19·614	19·622	19·630	19·638	·05	26·819	26·832	26·844	26·857	26·869	26·882	26·894	26·907	26·919	26·932
·378	19·646	19·654	19·661	19·669	19·677	19·684	19·690	19·697	19·704	19·711	·04	26·944	26·957	26·969	26·982	26·994	27·007	27·019	27·032	27·044	27·057
·379	19·721	19·732	19·744	19·755	19·767	19·779	19·790	19·801	19·813	19·825	·03	27·069	27·081	27·094	24·106	27·119	27·131	27·144	27·156	27·169	27·181
·380	19·838	19·850	19·862	19·874	19·886	19·898	19·909	19·921	19·983	19·946	·02	27·194	27·206	27·219	27·231	27·244	27·256	27·269	27·281	27·294	27·306
·381	19·959	19·972	19·985	20·000	20·030	20·066	20·101	20·137	20·167	20·209	·01	27·319	27·331	27·343	27·355	27·367	27·379	27·392	27·404	27·417	27·429
·382	20·245	20·281	...	...	...	...	...	...	...	...	·00	27·442	27·454	27·467	27·479	27·492	27·504	27·517	27·529	27·542	27·554

g—EYE-TABLE FOR YOGAS.

Moon's anomaly and equation of the centre expressed in days and fractions of a day.

(BRAHMA SIDDHĀNTA AND SIDDHĀNTA ŚIROMAṆI.)

Eqn.	0	1	2	3	4	5	6	7	8	9	Eqn.	9	8	7	6	5	4	3	2	1	0
—	Moon's anomaly in days										—	Moon's anomaly in days									
·00	0·000	0·014	0·028	0·041	0·054	0·067	0·080	0·093	0·106	0·120	·35	...				7·245	7·411	7·570	7·709	7·848	7·987
·01	0·132	0·146	0·159	0·173	0·187	0·200	0·213	0·226	0·240	0·254	·34	8·081	8·130	8·179	8·228	8·277	8·326	8·370	8·414	8·458	8·502
·02	0·267	0·280	0·294	0·307	0·320	0·334	0·347	0·361	0·374	0·387	·33	8·546	8·590	8·634	8·669	8·704	8·719	8·754	8·789	8·824	8·859
·03	0·401	0·414	0·428	0·441	0·454	0·468	0·481	0·495	0·508	0·522	·32	8·894	8·929	8·964	8·999	9·032	9·061	9·090	9·119	9·148	9·177
·04	0·535	0·547	0·561	0·575	0·588	0·602	0·614	0·628	0·642	0·656	·31	9·206	9·230	9·254	9·278	9·302	9·326	9·350	9·378	9·398	9·422
·05	0·669	0·682	0·695	0·709	0·722	0·735	0·749	0·762	0·776	0·789	·30	9·446	9·470	9·493	9·516	9·539	9·562	9·585	9·608	9·631	9·654
·06	0·802	0·816	0·829	0·843	0·856	0·869	0·883	0·896	0·910	0·924	·29	9·676	9·698	9·719	9·741	9·762	9·783	9·804	9·825	9·847	9·869
·07	0·938	0·952	0·965	0·979	0·993	1·007	1·021	1·034	1·048	1·062	·28	9·890	9·911	9·932	9·953	9·973	9·993	10·013	10·033	10·054	10·078
·08	1·075	1·090	1·103	1·117	1·131	1·144	1·158	1·172	1·186	1·200	·27	10·092	10·111	10·130	10·149	10·168	10·187	10·206	10·225	10·244	10·262
·09	1·213	1·227	1·241	1·254	1·268	1·282	1·295	1·309	1·323	1·337	·26	10·280	10·298	10·316	10·334	10·352	10·368	10·385	10·403	10·421	10·439
·10	1·351	1·364	1·378	1·391	1·405	1·419	1·433	1·447	1·461	1·474	·25	10·457	10·473	10·490	10·506	10·524	10·541	10·558	10·574	10·590	10·607
·11	1·488	1·502	1·516	1·530	1·544	1·558	1·572	1·587	1·602	1·617	·24	10·624	10·641	10·657	10·672	10·688	10·704	10·719	10·735	10·751	10·767
·12	1·632	1·647	1·661	1·675	1·690	1·705	1·719	1·733	1·747	1·761	·23	10·782	10·797	10·813	10·829	10·845	10·861	10·877	10·893	10·909	10·924
·13	1·776	1·791	1·805	1·819	1·833	1·847	1·862	1·876	1·891	1·905	·22	10·940	10·955	10·970	10·985	11·000	11·015	11·030	11·045	11·059	11·073
·14	1·919	1·933	1·948	1·963	1·978	1·992	2·006	2·020	2·034	2·049	·21	11·087	11·101	11·115	11·129	11·143	11·157	11·171	11·185	11·200	11·215
·15	2·063	2·077	2·092	2·106	2·120	2·135	2·149	2·164	2·178	2·192	·20	11·229	11·243	11·257	11·271	11·285	11·299	11·314	11·328	11·343	11·358
·16	2·207	2·222	2·237	2·252	2·267	2·282	2·297	2·312	2·327	2·342	·19	11·373	11·387	11·401	11·415	11·429	11·443	11·457	11·471	11·485	11·499
·17	2·357	2·371	2·3[illegible]	2·401	2·416	2·431	2·446	2·461	2·476	2·490	·18	11·513	11·527	11·541	11·554	11·567	11·580	11·593	11·606	11·619	11·632
·18	2·505	2·520	2·535	2·550	2·565	2·580	2·595	2·610	2·626	2·642	·17	11·635	11·657	11·670	11·683	11·696	11·709	11·722	11·735	11·748	11·760
·19	2·658	2·674	2·690	2·706	2·722	2·738	2·754	2·770	2·786	2·802	·16	11·773	11·786	11·799	11·812	11·825	11·838	11·851	11·864	11·877	11·890
·20	2·819	2·836	2·853	2·869	2·886	2·902	2·918	2·934	2·950	2·966	·15	11·903	11·915	11·927	11·940	11·952	11·965	11·977	11·989	12·002	12·014
·21	2·982	2·999	3·016	3·032	3·048	3·064	3·080	3·096	3·112	3·128	·14	12·026	12·039	12·051	12·063	12·075	12·087	12·100	12·113	12·126	12·138
·22	3·144	3·160	3·176	3·193	3·210	3·227	3·244	3·261	3·278	3·295	·13	12·150	12·162	12·175	12·187	12·200	12·212	12·224	12·236	12·248	12·261
·23	3·313	3·330	3·348	3·366	3·384	3·402	3·420	3·438	3·456	3·473	·12	12·274	12·286	12·298	12·310	12·322	12·335	12·348	12·360	12·372	12·385
·24	3·490	3·508	3·526	3·544	3·561	3·579	3·597	3·614	3·632	3·651	·11	12·398	12·411	12·424	12·437	12·449	12·461	12·473	12·485	12·497	12·509
·25	3·670	3·689	3·707	3·725	3·744	3·763	3·783	3·801	3·820	3·838	·10	12·521	12·532	12·544	12·556	12·568	12·580	12·592	12·603	12·615	12·626
·26	3·858	3·878	3·898	3·918	3·937	3·955	3·975	3·995	4·015	4·035	·09	12·638	12·650	12·662	12·674	12·685	12·697	12·709	12·720	12·732	12·744
·27	4·055	4·075	4·096	4·117	4·138	4·159	4·180	4·201	4·222	4·243	·08	12·755	12·767	12·779	12·791	12·803	12·814	12·826	12·838	12·850	12·862
·28	4·264	4·285	4·308	4·330	4·352	4·374	4·396	4·419	4·442	4·465	·07	12·873	12·885	12·897	12·908	12·920	12·932	12·944	12·956	12·967	12·979
·29	4·488	4·512	4·536	4·559	4·582	4·605	4·628	4·652	4·675	4·699	·06	12·991	13·003	13·015	13·026	13·038	13·049	13·060	13·072	13·083	13·095
·30	4·723	4·748	4·773	4·798	4·823	4·848	4·873	4·898	4·923	4·949	·05	13·106	13·117	13·129	13·140	13·152	13·163	13·174	13·186	13·197	13·208
·31	4·975	5·001	5·026	5·053	5·079	5·105	5·131	5·157	5·183	5·209	·04	13·219	13·231	13·243	13·255	13·265	13·277	13·288	13·300	13·312	13·322
·32	5·240	5·271	5·302	5·333	5·364	5·395	5·430	5·467	5·504	5·541	·03	13·333	13·345	13·356	13·368	13·379	13·391	13·402	13·413	13·425	13·436
·33	5·578	5·615	5·652	5·689	5·726	5·743	5·780	5·817	5·863	5·909	·02	13·448	13·459	13·470	13·482	13·493	13·505	13·516	13·527	13·539	13·550
·34	5·955	6·001	6·047	6·093	6·139	6·190	6·241	6·292	6·343	6·394	·01	13·561	13·573	13·585	13·596	13·607	13·618	13·630	13·642	13·653	13·665
·35	6·490	6·631	6·772	6·913	7·074	7·242	...	...	...	...	·00	13·675	13·687	13·698	13·709	13·720	13·731	13·742	13·753	13·765	13·777

g—EYE-TABLE FOR YOGAS—*continued.*

Moon's anomaly and equation of the centre expressed in days and fractions of a day.

(BRAHMA SIDDHĀNTA AND SIDDHĀNTA ŚIROMAṆI.)

Eqn. +	0	1	2	3	4	5	6	7	8	9	Eqn. +	9	8	7	6	5	4	3	2	1	0
	Moon's anomaly in days.											Moon's anomaly in days									
·00	13·777	13·789	13·801	13·812	13·823	13·834	13·845	13·856	13·867	13·879	·35	...	...	...	...	20·312	20·480	20·641	20·782	20·923	21·064
·01	13·889	13·901	13·912	13·924	13·936	13·947	13·958	13·969	13·981	13·993	·34	21·160	21·211	21·262	21·313	21·364	21·415	21·461	21·507	21·553	21·599
·02	14·004	14·015	14·027	14·038	14·049	14·061	14·072	14·084	14·095	14·106	·33	21·645	21·691	21·737	21·774	21·791	21·828	21·865	21·902	21·939	21·976
·03	14·118	14·129	14·141	14·152	14·163	14·175	14·186	14·198	14·209	14·221	·32	22·013	22·050	22·087	22·124	22·159	22·190	22·221	22·252	22·283	22·314
·04	14·232	14·243	14·254	14·266	14·277	14·289	14·299	14·311	14·323	14·335	·31	22·345	22·371	22·397	22·423	22·449	22·475	22·501	22·527	22·553	22·579
·05	14·346	14·357	14·368	14·380	14·391	14·402	14·414	14·425	14·437	14·448	·30	22·605	22·631	22·656	22·681	22·706	22·731	22·756	22·781	22·806	22·831
·06	14·459	14·471	14·482	14·494	14·505	14·516	14·528	14·539	14·551	14·562	·29	22·855	22·879	22·902	22·926	22·949	22·972	22·995	23·018	23·042	23·066
·07	14·575	14·587	14·598	14·610	14·622	14·634	14·646	14·657	14·669	14·681	·28	23·089	23·112	23·135	23·158	23·180	23·202	23·224	23·246	23·269	23·290
·08	14·692	14·704	14·716	14·728	14·740	14·751	14·763	14·775	14·787	14·799	·27	23·311	23·332	23·353	23·374	23·395	23·416	23·437	23·458	23·479	23·499
·09	14·810	14·822	14·834	14·845	14·857	14·869	14·880	14·892	14·904	14·916	·26	23·519	23·539	23·559	23·579	23·599	23·617	23·636	23·656	23·676	23·696
·10	14·928	14·939	14·951	14·962	14·974	14·986	14·998	15·010	15·022	15·033	·25	23·716	23·734	23·753	23·771	23·791	23·810	23·829	23·847	23·865	23·884
·11	15·045	15·057	15·069	15·081	15·093	15·105	15·117	15·130	15·143	15·156	·24	23·903	23·922	23·940	23·957	23·975	23·993	24·010	24·028	24·046	24·064
·12	15·169	15·182	15·194	15·206	15·219	15·232	15·244	15·256	15·268	15·280	·23	24·081	24·098	24·116	24·136	24·154	24·172	24·190	24·208	24·226	24·243
·13	15·293	15·306	15·318	15·330	15·342	15·354	15·367	15·379	15·392	15·404	·22	24·261	24·278	24·295	24·312	24·329	24·346	24·363	24·380	24·396	24·412
·14	15·416	15·428	15·441	15·454	15·467	15·479	15·491	15·503	15·515	15·528	·21	24·428	24·444	24·460	24·476	24·492	24·508	24·524	24·540	24·557	24·574
·15	15·540	15·552	15·565	15·577	15·589	15·602	15·614	15·627	15·639	15·651	·20	24·590	24·606	24·622	24·638	24·654	24·670	24·687	24·703	24·720	24·737
·16	15·664	15·677	15·690	15·703	15·716	15·729	15·742	15·755	15·768	15·781	·19	24·754	24·770	24·786	24·802	24·818	24·834	24·850	24·866	24·882	24·898
·17	15·794	15·806	15·819	15·832	15·845	15·858	15·871	15·884	15·897	15·909	·18	24·914	24·930	24·946	24·961	24·976	24·991	25·006	25·021	25·036	25·051
·18	15·922	15·935	15·948	15·961	15·974	15·987	16·000	16·013	16·027	16·041	·17	25·066	25·080	25·095	25·110	25·125	25·140	25·155	25·170	25·185	25·199
·19	16·055	16·069	16·083	16·097	16·111	16·125	16·139	16·153	16·167	16·181	·16	25·214	25·229	25·244	25·259	25·274	25·289	25·304	25·319	25·334	25·349
·20	16·196	16·211	16·226	16·240	16·255	16·269	16·283	16·297	16·311	16·325	·15	25·364	25·378	25·392	25·407	25·421	25·436	25·450	25·464	25·479	25·493
·21	16·339	16·354	16·369	16·383	16·397	16·411	16·425	16·439	16·453	16·467	·14	25·507	25·522	25·536	25·550	25·564	25·578	25·593	25·608	25·623	25·637
·22	16·481	16·495	16·509	16·524	16·539	16·554	16·569	16·584	16·599	16·614	·13	25·651	25·665	25·680	25·694	25·709	25·723	25·737	25·751	25·765	25·780
·23	16·630	16·645	16·661	16·677	16·693	16·709	16·725	16·741	16·757	16·772	·12	25·795	25·809	25·823	25·837	25·851	25·866	25·881	25·895	25·909	25·924
·24	16·787	16·803	16·819	16·835	16·850	16·866	16·882	16·897	16·913	16·930	·11	25·939	25·954	25·969	25·984	25·998	26·012	26·026	26·040	26·054	26·068
·25	16·947	16·964	16·980	16·996	17·013	17·030	17·048	17·064	17·081	17·097	·10	26·082	26·095	26·109	26·123	26·137	26·151	26·165	26·178	26·192	26·205
·26	17·115	17·133	17·151	17·169	17·186	17·202	17·220	17·238	17·256	17·274	·09	26·219	26·233	26·247	26·261	26·274	26·288	26·302	26·315	26·329	26·343
·27	17·292	17·310	17·329	17·348	17·367	17·386	17·405	17·424	17·443	17·462	·08	26·356	26·370	26·384	26·398	26·412	26·425	26·439	26·453	26·467	26·481
·28	17·481	17·500	17·521	17·541	17·561	17·581	17·601	17·622	17·643	17·664	·07	26·494	26·508	26·522	26·535	26·549	26·563	26·577	26·591	26·604	26·618
·29	17·685	17·707	17·729	17·750	17·771	17·792	17·813	17·835	17·856	17·878	·06	26·632	26·646	26·660	26·673	26·687	26·700	26·713	26·727	26·740	26·754
·30	17·900	17·923	17·946	17·969	17·992	18·015	18·036	18·061	18·084	18·108	·05	26·767	26·780	26·794	26·807	26·821	26·834	26·847	26·861	26·874	26·887
·31	18·132	18·156	18·180	18·204	18·228	18·252	18·276	18·300	18·324	18·348	·04	26·900	26·914	26·928	26·942	26·954	26·968	26·981	26·995	27·009	27·021
·32	18·377	18·406	18·435	18·464	18·493	18·522	18·555	18·590	18·625	18·660	·03	27·034	27·048	27·061	27·074	27·087	27·101	27·114	27·127	27·141	27·154
·33	18·695	18·780	18·765	18·800	18·835	18·850	18·885	18·920	18·961	19·008	·02	27·168	27·181	27·194	27·208	27·221	27·235	27·248	27·261	27·275	27·288
·34	19·052	19·096	19·140	19·184	19·228	19·277	19·326	19·375	19·424	19·473	·01	27·301	27·315	27·329	27·342	27·355	27·368	27·382	27·396	27·409	27·423
·35	19·567	19·706	19·845	19·984	20·123	20·312	...	...	...	...	00	27·435	27·449	27·462	27·475	27·488	27·501	27·514	27·527	27·541	27·555

Sun's anomaly expressed as days of the solar year and sun's equation of the centre in fractions of a day.
(BRAHMA SIDDHĀNTA AND SIDDHĀNTA ŚIROMAṆI.)

Sun's anomaly in days of the solar year.

Eqn. +	9	8	7	6	5	4	3	2	1	0
175	...	...	...	...	0·16	0·36	0·56	0·76	0·96	1·16
·174	1·30	1·45	1·59	1·73	1·87	2·02	2·16	2·30	2·44	2·59
·173	2·73	2·87	3·02	3·16	3·30	3·44	3·58	3·73	3·87	4·01
·172	4·16	4·30	4·44	4·58	4·73	4·87	5·01	5·13	5·24	5·35
·171	5·47	5·59	5·70	5·82	5·92	6·04	6·15	6·26	6·37	6·49
·170	6·60	6·72	6·83	6·94	7·04	7·17	7·28	7·40	7·51	7·72
·16	8·76	9·69	10·62	11·55	12·49	13·28	14·27	14·83	15·65	16·44
·15	17·18	17·82	18·51	19·20	19·90	20·54	21·16	21·77	22·39	23·00
·14	23·62	24·20	24·76	25·32	25·89	26·45	27·01	27·55	28·08	28·60
·13	29·12	29·64	30·16	30·68	31·21	31·71	32·20	32·67	33·15	33·62
·12	34·10	34·58	35·05	35·51	35·97	36·42	36·87	37·32	37·77	38·22
·11	38·66	39·10	39·52	39·95	40·39	40·82	41·24	41·66	42·08	42·50
·10	42·92	43·13	43·74	44·15	44·56	44·97	45·37	45·77	46·17	46·56
·09	46·94	47·33	47·71	48·09	48·49	48·87	49·25	49·63	50·02	50·40
·08	50·78	51·15	51·52	51·89	52·27	52·64	53·01	53·38	53·75	54·11
·07	54·47	54·83	55·19	55·55	55·92	56·27	56·63	56·99	57·35	57·70
·06	58·06	58·41	58·76	59·11	59·47	59·82	60·17	60·52	60·88	61·23
·05	61·58	61·93	62·28	62·63	62·99	63·33	63·67	64·01	64·35	64·69
·04	65·03	65·37	65·70	66·02	66·36	66·70	67·03	67·37	67·70	68·04
·03	68·37	68·71	69·05	69·38	69·72	70·05	70·38	70·77	71·04	71·38
·02	71·71	72·04	72·37	72·70	73·04	73·37	73·69	74·02	74·35	74·68
·01	75·00	75·33	75·66	75·99	76·33	76·65	76·98	77·31	77·64	77·96
·00	78·29	78·62	78·94	79·27	79·61	79·94	80·26	80·58	80·91	81·23

Sun's anomaly in days of the solar year.

Eqn. −	0	1	2	3	4	5	6	7	8	9
·00	81·23	81·55	81·88	82·20	82·52	82·85	83·19	83·52	83·84	84·17
·01	84·50	84·82	85·15	85·48	85·81	86·13	86·47	86·80	87·13	87·46
02	87·78	88·11	88·44	88·77	89·09	89·42	89·76	90·09	90·42	90·75
03	91·08	91·42	91·75	92·08	92·41	92·74	93·08	93·42	93·75	94·09
04	94·42	94·76	95·09	95·43	95·76	96·10	96·44	96·76	97·09	97·43
·05	97·77	98·11	98·45	98·79	99·13	99·47	99·83	100·18	100·53	100·88
06	101·23	101·58	101·94	102·29	102·64	102·99	103·35	103·70	104·05	104·40
·07	104·76	105·11	105·47	105·83	106·19	106·54	106·91	107·27	107·63	107·99
08	108·35	108·71	109·08	109·45	109·82	110·19	110·57	110·94	111·31	111·68
09	112·06	112·44	112·83	113·21	113·59	113·97	114·37	114·75	115·13	115·52
10	115·90	116·29	116·69	117·09	117·49	117·90	118·31	118·72	119·13	119·54
11	119·93	120·16	120·80	121·22	121·64	122·06	122·50	122·93	123·35	123·79
12	124·23	124·68	125·13	125·58	126·03	126·48	126·94	127·40	127·87	128·35
13	128·83	129·30	129·78	130·25	130·74	131·24	131·77	132·29	132·81	133·33
14	133·85	134·37	134·90	135·44	136·00	136·56	137·13	137·69	138·25	138·83
15	139·45	140·06	140·68	141·29	141·91	142·55	143·25	143·94	144·63	145·32
16	146·01	146·80	147·59	148·38	149·17	149·96	150·90	151·83	152·76	153·69
·170	154·83	154·94	155·05	155·17	155·28	155·39	155·51	155·62	155·73	155·85
171	155·96	156·08	156·19	156·30	156·41	156·53	156·64	156·76	156·87	156·98
172	157·10	157·21	157·32	157·44	157·58	157·72	157·87	158·01	158·15	158·29
173	158·44	158·58	158·72	158·87	159·01	159·15	159·29	159·43	159·58	159·72
174	159·86	160·01	160·15	160·29	160·43	160·58	160·72	160·86	161·00	161·15
·175	161·29	161·49	161·69	161·89	162·09	162·29	162·50	162·70	162·90	163·10
·176	163·30	163·50	163·70	163·90	164·10	164·30	164·50	164·70	164·90	165·10
177	165·41	165·76	166·11	166·47	166·81	167·16	167·51	167·86	168·21	168·56
·178	168·93	169·87	170·82	171·77	172·72					

Sun's anomaly in days of the solar year.

Eqn. −	9	8	7	6	5	4	3	2	1	0
·178	...		.	...	..	172·72	173·63	74·57	175·52	176·52
·177	176·89	177·24	177·59	177·94	178·29	178·64	178·99	179·34	179·69	180·06
·176	180·34	180·54	180·74	180·94	181·14	181·34	181·54	181·74	181·94	182·14
·175	182·34	182·54	182·74	182·94	183·13	183·33	183·53	183·73	183·93	184·13
·174	184·27	184·42	184·56	184·70	184·84	184·99	185·13	185·27	185·41	185·56
173	185·70	185·84	185·99	186·13	186·27	186·41	186·55	186·70	186·84	186·98
172	187·13	187·27	187·41	187·55	187·70	187·84	187·98	188·10	188·21	188·32
·171	188·44	188·55	188·66	188·78	188·89	189·01	189·12	189·23	189·34	189·46
·170	189·57	189·69	189·80	189·91	190·03	190·14	190·25	190·37	190·48	190·59
·16	191·73	192·66	193·59	194·52	195·44	196·23	197·02	197·81	198·60	199·39
·15	200·18	200·77	201·46	202·15	202·83	203·47	204·09	204·70	205·32	205·93
14	206·55	207·13	207·69	208·25	208·80	209·36	209·92	210·46	210·99	211·51
·13	212·03	212·55	213·07	213·59	214·10	214·60	215·09	215·56	216·04	216·51
·12	216·99	217·47	217·94	218·40	218·84	219·29	219·74	220·19	220·64	221·09
·11	221·53	221·97	222·39	222·82	223·24	223·77	224·09	224·51	224·71	225·35
·10	225·77	226·18	226·59	227·00	227·39	227·80	228·20	228·60	229·00	229·39
·09	229·77	230·16	230·54	230·92	231·30	231·68	232·06	232·44	232·83	233·31
08	233·59	233·96	234·33	234·70	235·06	235·43	235·80	236·17	236·54	236·90
07	236·26	237·62	237·98	238·34	238·69	239·04	239·40	239·76	240·12	240·47
06	240·83	241·18	241·53	241·88	242·22	242·57	242·92	243·27	243·63	243·98
05	244·33	244·68	245·03	245·38	245·72	246·06	246·40	246·74	247·08	247·42
·04	247·76	248·10	248·43	248·75	249·07	249·41	249·74	250·08	250·41	250·75
·03	251·08	251·42	251·75	252·09	252·41	252·74	253·07	253·40	253·73	254·07
·02	254·40	254·73	255·06	255·39	255·71	256·04	256·36	256·69	257·02	257·35
·01	257·67	258·00	258·33	258·66	258·96	259·30	259·63	259·96	260·29	260·61
00	260·94	261·27	261·59	261·92	262·24	262·57	262·89	263·21	263·54	263·86

Sun's anomaly in days of the solar year.

Eqn. +	0	1	2	3	4	5	6	7	8	9
00	263·86	264·18	264·51	264·83	265·15	265·48	265·80	266·13	266·45	266·78
01	267·11	267·43	267·76	268·09	268·42	268·74	269·08	269·39	269·72	270·05
02	270·37	270·70	271·03	271·36	271·68	272·01	272·33	272·66	272·99	273·32
03	273·65	273·99	274·32	274·65	274·98	275·31	275·63	275·97	276·30	276·64
04	276·97	277·31	277·64	277·98	278·31	278·65	278·97	279·29	279·62	279·96
05	280·30	280·64	280·98	281·32	281·66	282·00	282·34	282·69	283·04	283·39
06	283·74	284·09	284·45	284·80	285·15	285·50	285·84	286·19	286·54	286·89
07	287·25	287·60	287·96	288·32	288·68	289·03	289·38	289·74	290·10	290·46
08	290·82	291·18	291·55	291·92	292·29	292·66	293·02	293·39	293·76	294·13
09	294·51	294·89	295·28	295·66	296·04	296·42	296·80	297·18	297·56	297·95
10	298·33	298·72	299·12	299·52	299·92	300·33	300·72	301·13	301·54	301·95
11	302·37	302·79	303·21	303·63	304·05	304·47	304·89	305·32	305·74	306·18
12	306·62	307·07	307·52	307·97	308·42	308·87	309·31	309·77	310·24	310·72
13	311·20	311·67	312·15	312·62	313·11	313·61	314·12	314·64	315·16	315·68
14	316·20	316·72	317·25	317·79	318·35	318·91	319·46	320·02	320·58	321·16
15	321·78	322·39	323·01	323·62	324·24	324·88	325·56	326·25	326·94	327·63
16	328·32	329·11	329·90	330·69	331·48	332·27	333·19	334·12	335·05	335·98
·170	337·12	337·23	337·34	337·46	337·57	337·68	337·80	337·91	338·02	338·14
171	338·25	338·37	338·48	338·59	338·70	338·82	338·93	339·05	339·16	339·27
172	339·39	339·50	339·61	339·73	339·87	340·01	340·16	340·30	340·44	340·58
173	340·73	340·87	341·01	341·16	341·30	341·44	341·58	341·72	341·87	342·01
174	342·15	342·30	342·44	342·58	342·72	342·87	343·01	343·15	343·29	343·44
175	343·58	343·78	343·98	344·18	344·38	344·58	344·77	344·97	345·18	345·37
176	345·57	345·77	345·97	346·17	346·37	346·57	346·77	346·97	347·17	347·37
177	347·58	347·93	348·28	348·63	348·98	349·33	349·68	350·03	350·38	350·73
178	351·20	352·14	353·09	354·04	354·99		...	...		...

Eqn.	9	8	7	6	5	4	3	2	1	0
·178	..	...	..	.	...	354·99	355·90	356·84	357·79	358·79
177	359·16	359·51	359·86	360·21	360·56	360·91	361·26	361·61	361·96	362·33
176	362·61	362·81	363·01	363·21	363·41	363·61	363·81	364·01	364·21	364·41
175	364·61	364·81	365·01	365·21	...	.		...	...	...

i—EYE-TABLE FOR YOGAS.

Sun's anomaly expressed as days of the solar year and sun's equation of the centre in fractions of a day.

(BRAHMA SIDDHĀNTA AND SIDDHĀNTA ŚIROMAṆI.)

Eqn. —	9	8	7	6	5	4	3	2	1	0
	Sun's anomaly in days of the solar year.									
·151	...	...	...	...	...	...	0·16	0·40	0·64	0·88
·150	1·05	1·22	1·40	1·57	1·75	1·93	2·10	2·28	2·45	2·62
·14	4·33	5·90	7·30	8·51	9·61	10·71	11·81	12·81	13·62	14·63
·13	15·54	16·45	17·36	18·12	18·87	19·63	20·39	21·15	21·91	22·67
·12	23·84	24·02	24·69	25·36	26·02	26·69	27·32	27·95	28·57	29·19
·11	29·81	30·43	30·99	31·55	32·10	32·66	33·22	33·78	34·34	34·90
·10	35·45	35·98	36·55	37·10	37·59	38·09	38·59	39·09	39·59	40·09
·09	40·59	41·07	41·56	42·05	42·53	43·02	43·51	43·97	44·43	44·90
·08	45·37	45·84	46·31	46·78	47·24	47·67	48·11	48·55	48·99	49·42
·07	49·86	50·30	50·74	51·18	51·61	52·05	52·48	52·89	53·32	53·74
·06	54·17	54·59	55·01	55·43	55·84	56·26	56·68	57·10	57·51	57·92
·05	58·33	58·74	59·15	59·56	59·96	60·37	60·78	61·19	61·59	61·99
·04	62·40	62·80	63·20	63·60	64·00	64·39	64·77	65·16	65·56	65·95
·03	66·34	66·73	67·10	67·48	67·86	68·26	68·66	69·05	69·43	69·81
·02	70·20	70·59	70·98	71·36	71·73	72·12	72·49	72·87	73·25	73·63
·01	74·41	74·39	74·77	75·15	75·52	75·90	76·28	76·66	77·04	77·42
·00	77·80	78·18	78·56	78·94	79·31	79·69	80·07	80·45	80·83	81·22

Eqn. +	0	1	2	3	4	5	6	7	8	9
	Sun's anomaly in days of the solar year.									
00	81·23	81·62	82·00	82·38	82·76	83·14	83·51	83·89	84·27	84·65
·01	85·03	85·41	85·79	86·17	86·55	86·93	87·30	87·68	88·06	88·44
·02	88·82	89·20	89·58	89·96	90·34	90·72	91·09	91·47	91·86	92·25
·03	92·64	93·02	93·40	93·79	94·19	94·59	94·97	95·35	95·71	96·11
·04	96·50	96·84	97·29	97·68	98·06	98·46	98·85	99·25	99·65	100·05
·05	100·46	100·86	101·26	101·67	102·08	102·49	102·89	103·30	103·71	104·12
·06	104·53	104·94	105·35	105·77	106·19	106·61	107·02	107·44	107·86	108·28
07	108·71	109·13	109·56	109·97	110·40	110·84	111·27	111·71	112·15	112·59
·08	113·03	113·46	113·90	114·34	114·78	115·21	115·67	116·14	116·61	117·08
·09	117·55	118·02	118·48	118·94	119·43	119·92	120·40	120·89	121·38	121·86
·10	122·36	122·86	123·36	123·86	124·36	124·86	125·35	125·91	126·47	127·00
·11	127·55	128·11	128·67	129·23	129·79	130·35	130·90	131·46	132·02	132·64
·12	133·26	133·88	134·50	135·13	135·76	136·43	137·09	137·76	138·43	139·11
·13	139·78	140·54	141·30	142·06	142·82	143·58	144·33	145·09	146·00	146·91
·14	147·82	148·73	149·64	150·64	151·74	152·84	153·94	155·15	156·55	158·12
·150	159·83	160·00	160·17	160·35	160·52	160·70	160·88	161·05	161·23	161·40
·151	161·57	161·81	162·05	162·29	162·53	162·77	163·01	163·25	163·49	163·73
·152	163·97	164·28	164·59	164·91	165·23	165·55	165·87	166·19	166·51	166·83
·153	167·15	168·02	168·89	169·76	170·63	171·51	172·39	...	...	...

Eqn. +	9	8	7	6	5	4	3	2	1	0
	Sun's anomaly in days of the solar year.									
·153	...	...	...	172·39	173·27	174·15	175·02	175·89	176·76	177·63
·152	177·95	178·27	178·59	178·91	179·23	179·55	179·87	180·19	180·50	180·81
·151	181·05	181·29	181·53	181·77	182·01	182·25	182·49	182·73	182·97	183·21
·150	183·38	183·55	183·73	183·90	184·08	184·26	184·43	184·61	184·78	184·95
·14	186·66	188·23	189·63	190·84	191·96	193·06	194·16	195·16	196·07	196·98
·13	197·89	198·80	199·71	200·47	201·24	202·00	202·76	203·52	204·28	205·04
·12	205·71	206·39	207·06	207·73	208·41	209·08	209·71	210·34	210·96	211·58
·11	212·20	212·82	213·38	213·94	214·51	215·07	215·63	216·19	216·75	217·31
·10	217·86	218·39	218·96	219·51	220·02	220·52	221·02	221·40	222·02	222·52
·09	223·02	223·50	223·99	224·48	224·98	225·47	225·96	226·42	226·88	227·35
·08	227·82	228·29	228·76	229·23	229·71	230·14	230·58	231·02	231·46	231·89
·07	232·33	232·77	233·21	233·65	234·10	234·54	234·97	235·38	235·81	236·23
·06	236·66	237·08	237·50	237·92	238·35	238·77	239·19	239·61	240·02	240·43
·05	240·84	241·25	241·66	242·07	242·49	242·90	243·31	243·72	244·12	244·52
·04	244·93	245·33	245·73	246·13	246·54	246·94	247·32	247·71	248·11	248·50
·03	248·89	249·28	249·65	250·03	250·43	250·83	251·23	251·62	252·00	252·38
·02	252·77	253·16	253·55	253·93	254·32	254·70	255·08	255·45	255·84	256·22
·01	256·61	256·99	257·37	257·75	258·14	258·52	258·90	259·28	259·66	260·04
·00	260·42	260·80	261·18	261·56	261·95	262·33	262·71	263·09	263·47	263·86

Eqn. —	0	1	2	3	4	5	6	7	8	9
	Sun's anomaly in days of the solar year									
·00	263·86	264·25	264·63	265·01	265·39	265·77	266·16	266·54	266·94	267·30
·01	267·68	268·06	268·44	268·82	269·20	269·58	269·97	270·35	270·73	271·11
·02	271·49	271·87	272·25	272·63	273·00	273·39	273·78	274·16	274·55	274·94
·03	275·33	275·71	276·09	276·48	276·88	277·28	277·68	278·06	278·43	278·82
·04	279·21	279·60	280·00	280·39	280·77	281·17	281·58	281·98	282·38	282·78
·05	283·19	283·59	283·99	284·40	284·71	285·22	285·64	286·05	286·46	286·87
·06	287·28	287·69	288·10	288·52	288·94	289·36	289·79	290·21	290·63	291·05
07	291·48	291·99	292·33	292·74	293·17	293·61	294·06	294·50	294·94	295·38
08	295·82	296·25	296·69	297·13	297·57	298·00	298·48	298·95	299·42	299·89
·09	300·36	300·83	301·29	301·75	302·24	302·73	303·23	303·72	304·21	304·69
·10	305·19	305·69	306·19	306·69	307·19	307·69	308·20	308·75	309·32	309·85
·11	310·40	310·96	311·52	312·08	312·64	313·20	313·77	314·33	314·89	315·51
·12	316·13	316·75	317·37	318·00	318·63	319·30	319·93	320·65	321·32	322·00
·13	322·67	323·43	324·19	324·95	325·71	326·47	327·24	328·00	328·91	329·82
·14	330·73	331·74	332·55	333·55	334·65	335·75	336·87	338·08	339·48	341·05
·150	342·76	342·93	343·10	343·28	343·45	343·63	343·81	343·98	344·16	344·33
·151	344·50	344·74	344·98	345·22	345·46	345·70	345·94	346·18	346·42	346·66
·152	346·90	347·21	347·52	347·84	348·16	348·48	348·80	349·12	349·44	349·76
·153	350·08	350·95	351·82	352·69	353·56	354·44	355·32	...	...	...

Eqn. +	9	8	7	6	5	4	3	2	1	0
·153	...		...	355·32	356·20	357·08	357·95	358·82	359·69	360·56
·152	360·88	361·20	361·52	361·84	362·16	362·48	362·80	363·12	363·43	363·74
·151	363·98	364·22	364·46	364·70	364·94	365·18	...	...	...	...

TABLE I (i).

Jupiter's Cycle of 60 years—Southern Cycle. A.D. 967 to 1926 with corresponding A.D. years—(Centuries A.D. in heavy type).

(*N.B.*—The Indian year begins in March or April of the A.D. year.)

No.	Name																
1	Prabhava ...	**9** 67	**10** 27	**10** 87	**11** 47	**12** 07	**12** 67	**13** 27	**13** 87	**14** 47	**15** 07	**15** 67	**16** 27	**16** 87	**17** 47	**18** 07	**18** 67
2	Vibhava ...	68	28	88	48	08	68	28	88	48	08	68	28	88	48	08	68
3	Śukla	69	29	89	49	09	69	29	89	49	09	69	29	89	49	09	69
4	Pramodhūta ...	70	30	90	50	10	70	30	90	50	10	70	30	90	50	10	70
5	Prajāpati ...	71	31	91	51	11	71	31	91	51	11	71	31	91	51	11	71
6	Aṅgirasa ...	72	32	92	52	12	72	32	92	52	12	72	32	92	52	12	72
7	Śrīmukha ...	73	33	93	53	13	73	33	93	53	13	73	33	93	53	13	73
8	Bhāva ...	74	34	94	54	14	74	34	94	54	14	74	34	94	54	14	74
9	Yuva	75	35	95	55	15	75	35	95	55	15	75	35	95	55	15	75
10	Dhātri ..	76	36	96	56	16	76	36	96	56	16	76	36	96	56	16	76
11	Īśvara .	77	37	97	57	17	77	37	97	57	17	77	37	97	57	17	77
12	Bahudhānya ...	78	38	98	58	18	78	38	98	58	18	78	38	98	58	18	78
13	Pramāthi ...	79	39	99	59	19	79	39	99	59	19	79	39	99	59	19	79
14	Vikrama ...	80	40	**11** 00	60	20	80	40	**14** 00	60	20	80	40	**17** 00	60	20	80
15	Vṛisha ...	81	41	01	61	21	81	41	01	61	21	81	41	01	61	21	81
16	Chitrabhānu ...	82	42	02	62	22	82	42	02	62	22	82	42	02	62	22	82
17	Subhānu ...	83	43	03	63	23	83	43	03	63	23	83	43	03	63	23	83
18	Tāraṇa ...	84	44	04	64	24	84	44	04	64	24	84	44	04	64	24	84
19	Pārthiva ..	85	45	05	65	25	85	45	05	65	25	85	45	05	65	25	85
20	Vyaya ...	86	46	06	66	26	86	46	06	66	26	86	46	06	66	26	86
21	Sarvajit ...	87	47	07	67	27	87	47	07	67	27	87	47	07	67	27	87
22	Sarvadhāri ...	88	48	08	68	28	88	48	08	68	28	88	48	08	68	28	88
23	Virodhi ...	89	49	09	69	29	89	49	09	69	29	89	49	09	69	29	89
24	Vikṛita ...	90	50	10	70	30	90	50	10	70	30	90	50	10	70	30	90
25	Khara	91	51	11	71	31	91	51	11	71	31	91	51	11	71	31	91
26	Nandana ...	92	52	12	72	32	92	52	12	72	32	92	52	12	72	32	92
27	Vijaya ...	93	53	13	73	33	93	53	13	73	33	93	53	13	73	33	93
28	Jaya	94	54	14	74	34	94	54	14	74	34	94	54	14	74	34	94
29	Manmatha .	95	55	15	75	35	95	55	15	75	35	95	55	15	75	35	95
30	Durmukha ...	96	56	16	76	36	96	56	16	76	36	96	56	16	76	36	96
31	Hemalamba ...	97	57	17	77	37	97	57	17	77	37	97	57	17	77	37	97
32	Vilamba ...	98	58	18	78	38	98	58	18	78	38	98	58	18	78	38	98
33	Vikāri	99	59	19	79	39	99	59	19	79	39	99	59	19	79	39	99
34	Śārvari ...	**10** 00	60	20	80	40	**13** 00	60	20	80	40	**16** 00	60	20	80	40	**19** 00
35	Plava	01	61	21	81	41	01	61	21	81	41	01	61	21	81	41	01
36	Śubhakṛit ...	02	62	22	82	42	02	62	22	82	42	02	62	22	82	42	02
37	Sobhana (Sobhakrit).	03	63	23	83	43	03	63	23	83	43	03	63	23	83	43	03
38	Krodhi ...	04	64	24	84	44	04	64	24	84	44	04	64	24	84	44	04
39	Viśvāvasu ...	05	65	25	85	45	05	65	25	85	45	05	65	25	85	45	05
40	Parābhava .	06	66	26	86	46	06	66	26	86	46	06	66	26	86	46	06
41	Plavaṅga ...	07	67	27	87	47	07	67	27	87	47	07	67	27	87	47	07
42	Kīlaka ...	08	68	28	88	48	08	68	28	88	48	08	68	28	88	48	08
43	Saumya ...	09	69	29	89	49	09	69	29	89	49	09	69	29	89	49	09
44	Sādharaṇa ...	10	70	30	90	50	10	70	30	90	50	10	70	30	90	50	10
45	Virodhakṛit ...	11	71	31	91	51	11	71	31	91	51	11	71	31	91	51	11
46	Paridhāvi ...	12	72	32	92	52	12	72	32	92	52	12	72	32	92	52	12
47	Pramādīcha ...	13	73	33	93	53	13	73	33	93	53	13	73	33	93	53	13
48	Ānanda ...	14	74	34	94	54	14	74	34	94	54	14	74	34	94	54	14
49	Rākshasa ...	15	75	35	95	55	15	75	35	95	55	15	75	35	95	55	15
50	Anala (Nala).	16	76	36	96	56	16	76	36	96	56	16	76	36	96	56	16
51	Piṅgala ...	17	77	37	97	57	17	77	37	97	57	17	77	37	97	57	17
52	Kālayukta ...	18	78	38	98	58	18	78	38	98	58	18	78	38	98	58	18
53	Siddhārthi ...	19	79	39	99	59	19	79	39	99	59	19	79	39	99	59	19
54	Raudra ..	20	80	40	**12** 00	60	20	80	40	**15** 00	60	20	80	40	**18** 00	60	20
55	Durmati ...	21	81	41	01	61	21	81	41	01	61	21	81	41	01	61	21
56	Dundubhi ...	22	82	42	02	62	22	82	42	02	62	22	82	42	02	62	22
57	Rudhirodgāri.	23	83	43	03	63	23	83	43	03	63	23	83	43	03	63	23
58	Raktāksha ...	24	84	44	04	64	24	84	44	04	64	24	84	44	04	64	24
59	Krodhana ...	25	85	45	05	65	25	85	45	05	65	25	85	45	05	65	25
60	Kshaya (Akshaya)	26	86	46	06	66	26	86	46	06	66	26	86	46	06	66	26

TABLE I (ii).

Jupiter's Cycle of 60 years—Northern System, showing suppressed years. A.D. 280 to A.D. 2000.

0	Vijaya	2 80	3 39	3 98	4 58	5 17	5 76	6 36	0	6 95	7 54	8 14	8 73	9 32	9 92	10 51	11 10
1	Jaya .. .	81	40	39	59	18	77	37	1	96	55	15	74	33	93	52	11
2	Manmatha ...	82	41	4 00	60	19	78	38	2	97	56	16	75	34	94	53	12
3	Durmukha .	83	42	01	61	20	79	39	3	98	57	17	76	35	.	54	13
4	Hemalamba ...	84	43	02	62	21	80	40	4	99	58	18	77	36	95	55	14
5	Vilamba .	85	44	03	63	22	81	41	5	7 00	59	19	78	37	96	56	15
6	Vikārin	86	45	04	64	23	82	42	6	01	60	20	79	38	97	57	16
7	Śārvari	87	46	05	65	24	83	43	7	02	61	21	80	39	98	58	17
8	Plava	88	47	06	66	25	84	44	8	03	62	22	81	40	99	59	18
9	Śubhakṛit .. .	89	48	07	67	26	85	45	9	04	63	23	82	41	10 00	60	19
10	Sobhana	90	49	08	68	27	86	46	10	05	64	...	83	42	01	61	20
11	Krodhin ..	91	50	09	69	28	87	47	11	06	65	24	84	43	02	62	21
12	Viśvāvasu ...	92	51	10	70	29	88	48	12	07	66	25	85	44	03	63	22
13	Parābhava ...	93	52	11	71	30	89	49	13	08	67	26	86	45	04	64	23
14	Plavanga	94	53	12	72	31	90	50	14	09	68	27	87	46	05	65	24
15	Kilaka	95	54	13	73	32	91	51	15	10	69	28	88	47	06	66	25
16	Saumya .	96	55	14	74	33	92	52	16	11	70	29	89	48	07	67	26
17	Sādharaṇa ..	97	56	15	75	34	93	53	17	12	71	30	90	49	08	68	27
18	Virodhakṛit ..	98	57	16	76	35	94		18	13	72	31	91	50	09	69	28
19	Paridhāvin .	99	58	17	77	36	95	54	19	14	73	32	92	51	10	70	29
20	Pramādin	3 00	59	18	78	37	96	55	20	15	74	33	93	52	11	71	30
21	Ānanda	01	60	19	79	38	97	56	21	16	75	34	94	53	12	72	31
22	Rākshasa	02	61	20	80	39	98	57	22	17	76	35	95	54	13	73	32
23	Anala ..	03	62	21	81	40	99	58	23	18	77	36	96	55	14	74	33
24	Pingala	04	63	22	82	41	6 00	59	24	19	78	37	97	56	15	75	34
25	Kālayukta ..	05	64	23	...	42	01	60	25	20	79	38	98	57	16	76	35
26	Siddhārtin ..	06	65	24	83	43	02	61	26	21	80	39	99	58	17	77	36
27	Raudra . .	07	66	25	84	44	03	62	27	22	81	40	9 00	59	18	78	37
28	Durmati	08	67	26	85	45	04	63	28	23	82	41	01	60	19	79	38
29	Dundubhi ...	09	68	27	86	46	05	64	29	24	83	42	02	61	20	..	39
30	Rudhirodgārin ...	10	69	28	87	47	06	65	30	25	84	43	03	62	21	80	40
31	Raktāksha	11	70	29	88	48	07	66	31	26	85	44	04	63	22	81	41
32	Krodhana ...		71	30	89	49	08	67	32	27	86	45	05	64	23	82	42
33	Kshaya	12	72	31	90	50	09	68	33	28	87	46	06	65	24	83	43
34	Prabhava	13	73	32	91	51	10	69	34	29	88	47	07	66	25	84	44
35	Vibhava	14	74	33	92	52	11	70	35	30	89	48	08	67	26	85	45
36	Śukla	15	75	34	93	53	12	71	36	31	90	49	..	68	27	86	46
37	Pramoda	16	76	35	94	54	13	72	37	32	91	50	09	69	28	87	47
38	Prajāpati ..	17	77	36	95	55	14	73	38	33	92	51	10	70	29	88	48
39	Angiras .. .	18	78	37	96	56	15	74	39	34	93	52	11	71	30	89	49
40	Śrīmukha .	19	79	38	97	57	16	75	40	35	94	53	12	72	31	90	50
41	Bhāva	20	80	39	98	58	17	76	41	36	95	54	13	73	32	91	51
42	Yuva	21	81	40	99	59	18	77	42	37	96	55	14	74	33	92	52
43	Dhātri	22	82	41	5 00	60	19	78	43	38	97	56	15	75	34	93	53
44	Īśvara	23	83	42	01	61	20	79	44	.	98	57	16	76	35	94	54
45	Bahudhānya ...	24	84	43	02	62	21	80	45	39	99	58	17	77	36	95	55
46	Pramāthin ...	25	85	44	03	63	22	81	46	40	8 00	59	18	78	37	96	56
47	Vikrama . ..	26	86	45	04	64	23	82	47	41	01	60	19	79	38	97	57
48	Vṛisha	27	87	46	05	65	24	83	48	42	02	61	20	80	39	98	58
49	Chitrabhānu ...	28	88	47	06	66	25	84	49	43	03	62	21	81	40	99	59
50	Subhānu	29	89	48	07	67	26	85	50	44	04	63	22	82	41	11 00	60
51	Tāraṇa	30	90	49	08	..	27	86	51	45	05	64	23	83	42	01	61
52	Pārthiva	31	91	50	09	68	28	87	52	46	06	65	24	84	43	02	62
53	Vyaya	32	92	51	10	69	29	88	53	47	07	66	25	85	44	03	63
54	Sarvajit	33	93	52	11	70	30	89	54	48	08	67	26	86	45	04	64
55	Sarvadhārin ...	34	94	53	12	71	31	90	55	49	09	68	27	87	46	05	...
56	Virodhin	35	95	54	13	72	32	91	56	50	10	69	28	88	47	06	65
57	Vikṛita	36	96	55	14	73	33	92	57	51	11	70	29	89	48	07	66
58	Khara	37	97	56	15	74	34	93	58	52	12	71	30	90	49	08	67
59	Nandana	38	...	57	16	75	35	94	59	53	13	72	31	91	50	09	68

TABLE I (ii)—*cont.*

Jupiter's Cycle of 60 years—Northern System, showing suppressed years. A.D. 280 to A.D. 2000—*cont.*

Vijaya ...	1166	1229	1288	1347	1407	1466	1525	0	1585	1644	1703	1763	1822	1881	1941
Jaya	70	80	89	48	08	67	26	1	86	45	04	64	23	82	...
Manmatha ...	71	81	90	49	09	68	27	2	87	46	05	65	24	83	42
Durmukha ..	72	32	91	50	10	69	28	3	88	47	06	66	25	84	43
Hemalamba ...	73	33	92	51	11	70	29	4	89	48	07	87	26	85	44
Vilamba ...	74	34	93	52	12	71	30	5	90	49	08	68	27	86	45
Vikārin ...	75	35	94	53	13	72	31	6	91	50	09	69	28	87	46
Śārvari ..	76	36	95	54	14	73	32	7	92	51	10	70	29	88	47
Plava	77	37	96	55	15	74	33	8	93	52	11	71	30	89	48
Śubhakrit ...	78	38	97	56	16	75	34	9	94	53	12		31	90	49
Sobhana ...	79	39	98	57	17	76	35	10	95	54	13	72	32	91	50
Krodhin .	80	40	99	58	18	77	36	11	96	55	14	73	33	92	51
Viśvāvasu ..	81	41	1300	59	19	78	37	12	97	56	15	74	34	93	52
Parābhava ...	82	42	01	60	20	79	38	13	98	57	16	75	85	94	53
Plavanga ...	83	43	02	61	.	80	39	14	99	58	17	76	36	95	54
Kīlaka ...	84	44	03	62	21	81	40	15	1600	59	18	77	37	96	55
Saumya .	85	45	04	63	22	82	41	16		60	19	78	38	97	56
Sādhāraṇa ...	86	46	05	64	23	83	42	17	01	61	20	79	39	98	57
Virodhakṛit ...	87	47	06	65	24	84	43	18	02	62	21	80	40	99	58
Paridhāvin ...	88	48	07	66	25	85	44	19	03	63	22	81	41	1900	59
Pramādin ...	89	49	08	67	26	86	45	20	04	64	23	82	42	01	60
Ānanda ...	90	50	09	68	27	87	46	21	05	65	24	83	43	02	61
Rākshasa	91	..	10	69	28	88	47	22	06	66	25	84	41	03	62
Anala	92	51	11	70	29	89	48	23	07	67	26	85	45	04	63
Piṅgala ...	93	52	12	71	30	90	49	24	08	68	27	86	46	05	64
Kālayukta ...	94	53	13	72	31	91	50	25	09	69	28	87	47	06	65
Siddhārtin ..	95	54	14	73	32	92	51	26	10	70	29	88	48	07	66
Raudra .	96	55	15	74	33	93	52	27	11	71	30	89	49	08	67
Durmati ..	97	56	16	75	34	94	53	28	12	72	31	90	50	09	68
Dundubhi .	98	57	17	76	35	95	54	29	13	73	32	91	51	10	69
Rudhirodgārin.	99	58	18	77	36	96	55	30	14	74	33	92	52	11	70
Raktāksha ..	1200	59	19	78	37	97	56	31	15	75	34	93	53	12	71
Krodhana ..	01	60	20	79	38	98	57	32	16	76	35	94	54	13	72
Kshaya	02	61	21	80	39	99	58	33	17	77	86	95	55	14	73
Prabhava ...	03	62	22	81	40	1500	59	34	18	78	37	96	56	15	74
Vibhava ...	04	63	23	82	41	01	60	35	19	79	38	97	.	16	75
Śukla	05	64	24	83	42	02	61	36	20	80	39	98	57	17	76
Pramoda .	06	65	25	84	43	03	62	37	21	81	40	99	58	18	77
Prajāpati ..	07	66	26	85	44	04	63	38	22	82	41	1800	59	19	78
Angiras ...	08	67	27	86	45	05	64	39	23	83	42	01	60	20	79
Śrīmukha ...	09	68	28	87	46	06	65	40	24	84	43	02	61	21	80
Bhāva ...	10	69	29	88	47	07	66	41	25	85	44	03	62	22	81
Yuva ...	11	70	30	89	48	08	67	42	26	...	45	04	68	23	82
Dhātri ...	12	71	31	90	49	09	68	43	27	86	46	05	64	24	83
Īśvara ..	13	72	32	91	50	10	69	44	28	87	47	06	65	25	84
Bahudhānya ..	14	73	33	92	51	11	70	45	29	88	48	07	66	26	85
Pramāthin ...	15	74	34	93	52	12	71	46	30	89	49	08	67	27	86
Vikrama ...	16	75	35	94	53	13	72	47	31	90	50	09	68	28	87
Vṛisha ...	17	76	...	95	54	14	73	48	32	91	51	10	69	29	88
Chitrabhānu ...	18	77	36	96	55	...	74	49	33	92	52	11	70	30	89
Subhānu ...	19	78	37	97	56	15	75	50	34	93	53	12	71	31	90
Tāraṇa .	20	79	38	98	57	16	76	51	35	94	54	13	72	32	91
Pārthiva ...	21	80	39	99	58	17	77	52	36	95	55	14	73	33	92
Vyaya ...	22	81	40	1400	59	18	78	53	37	96	56	15	74	34	93
Sarvajit ...	23	82	41	01	60	19	79	54	38	97	57	16	75	35	94
Sarvadhārin ...	24	83	42	02	61	20	80	55	39	98	58	17	76	36	95
Virodhin ...	25	84	43	03	62	21	81	56	40	99	59	18	77	37	96
Vikṛita ...	26	85	44	04	63	22	82	57	41	1700	60	19	78	38	97
Khara ...	27	86	45	05	64	23	83	58	42	01	61	20	79	39	98
Nandana ...	28	87	46	06	65	24	84	59	43	02	62	21	80	40	99

TABLE I (iii).

Months.

Signs of Zodiac; also names of Malabar months.	Lunar months; also Bengal solar months.	Tamil solar months.	Sūrya siddhānta. Number of days in each solar month	Sūrya siddhānta. Moment of San-krānti; or No. of days up to beginning of each solar month.	Sūrya siddhānta. Moment of each new moon; or No. of days up to beginning of each lunar month.	Increase of ☾'s anomaly up to beginning of each lunar month.		No. of days in anomalistic months.	Ārya siddhānta. No. of days in each solar month.	Ārya siddhānta. Moment of san-krānti; or No. of days up to beginning of each solar month.
Mesha (Mal. Medam).	Vaiśākha ...	Chittirai ..	30·93528	.	..	...	1	27·5546	30·92500000	...
Vrishabha (Mal. Edavam).	Jyeshṭha	Vaigāśi ..	31·42028	30·93528	29·53059	1·976	2	55·1092	31·40111111	30·925000
Mithuna ...	Āshāḍha ...	Āni ...	31 64472	62·35555	59 06117	3·952	3	82·6638	31·60722222	62·3261111
Karkataka ..	Śrāvana ...	Ādi ...	31·47528	94·00028	88·59176	5·928	4	110·2184	31·46777777	93·9333338
Siṁha ..	Bhādrapada	Āvaṇi ...	31·01861	125·47555	118·12235	7·904	5	137·7730	31·03472222	125·4011111
Kanyā ...	Āśvina ...	Puraṭṭāśi ...	30 44138	156·49417	147·65293	9·880	6	165·3276	30·45666666	156·4358333
Tulā ...	Kārttika .	Aippaśi ...	29·89333	186·93555	177 18353	11·856	7	192·8822	29 90333333	186·8925000
Vṛiśchika ...	Mārgaśirsha.	Kārttigai ...	29·49027	216·82888	206·71411	13·832	8	220·4368	29 50861111	216·7958333
Dhanus ...	Pausha ..	Mārgaḻi ..	29·31777	246 31916	236·24470	15·808	9	247·9914	29·35055555	246 3044444
Makara ...	Māgha ...	Tai .	29 44805	275·63694	265·77529	17·784	10	275·5460	29 45666666	275·6550000
Kumbha ...	Phālguna .	Māśi ...	29 82027	305·08499	295·30588	19 760	11	303 1006	29·80833333	305·1116666
Mīna ...	Chaitra ..	Paṅguni	30·35348	334·90527	324·83647	21 736	12	330 6552	30·33876157	334·9200000
				365·25875	354 36705	23·712	13	358·2098		365·2586805
					383·89764	25·688				

TABLE I (iv). (See p. 30 of Text)

Limits of Adhika months.	Before		Before		After.	Before.	Limits of Kshaya months.	After	Before.
Vaiśākha ...	1·40469	Bhādrapada ...	8·84122	...	...	...	Margaśirsha .	10·07446	10·11475
Jyeshṭha ...	3·29438	Āśvina	9·75201	Phālguna .	9·77912	10·06880	Pausha	9·86164	10·07447
Āshāḍha ...	5 40851	Kārttika ...	10 11475	Chaitra ...	10·06880	10·89170	Māgha	9·77910	9·86164
Śrāvaṇa ...	7·35320	...	...	...	...	...	...	...	...

TABLE I (v).

Tithis.

Duration of tithis. Days.		Names of tithis.	Duration of tithis. Days.		Names of tithis.
0·98435	1	Śukla Pratipada.	15·74965	1	Krishna Prathama.
1·96870	2	Do. Dvitiya.	16·73400	2	Do. Dvitiya.
2·95306	3	Do Tritiya.	17 71835	3	Do. Tritiya.
3 93741	4	Do. Chaturthi.	18·70270	4	Do. Chaturthi.
4·92176	5	Do. Panchami.	19·68706	5	Do Panchami.
5·90612	6	Do Shashṭhi.	20·67141	6	Do. Shashṭhi.
6·89047	7	Do Saptami.	21·65576	7	Do. Saptami.
7·87482	8	Do. Ashtami.	22·64012	8	Do. Ashtami.
8·85918	9	Do. Navami.	23·62447	9	Do. Navami.
9·84353	10	Do. Daśami.	24·60882	10	Do. Daśami.
10·82788	11	Do. Ekādaśi.	25·59318	11	Do. Ekādaśi.
11·81223	12	Do. Dvādaśi.	26·57753	12	Do. Dvādaśi.
12·79659	13	Do. Trayodaśi.	27·56188	13	Do. Trayodaśi.
13·78094	14	Do. Chaturdaśi.	28·54623	14	Do. Chaturdaśi.
14·76529	15	Paurṇami.	29 53059	15	Amāvāsyā.

TABLE I (vi).

Nakshatras.

	Order and names of nakshatras.	Collective duration of nakshatras (equal space).	Deities presiding over nakshatras.	Duration of nakshatras (Garga).	Duration of nakshatras (Brahma).
		Days.		Days.	Days.
1	Aśvini	1·01191	Asvin ..	1·01191	1·0
2	Bharaṇī .	2·02383	Yama ..	1·51787	1·5
3	Kṛittikā (Tam. Kiruttigai).	3·03574	Agni ..	2·52978	2·5
4	Rohiṇī	4·04765	Prajāpati ...	4 04765	4·0
5	Mṛigaśiras (Tam. Mirugasiram).	5 05957	Soma ...	5·05956	5·0
6	Ardrā (Tam. Arudrā or Tiruvadirai).	6·07148	Rudra ...	5 56552	5·5
7	Punarvasu	7·08340	Aditi ..	7·08339	7·0
8	Pushya (Tam. Pusam).	8·09531	Brihaspati .	8·09531	8·0
9	Asleshā (Tam. Ayilyam).	9·10722	Sarpah ..	8·60126	8 5
10	Māgha (Tam. Magham).	10·11914	Pitarah ..	9 61318	9 5
11	Pūrva-Phalguni (Tam. Pūram).	11·13105	Bhaga ..	10 62510	10·5
12	Uttara-Phalguni (Tam. Uttiram).	12·14297	Aryaman ..	12 14297	12·0
13	Hasta (Tam. Hastam).	13·15488	Sāvitri ..	13·15488	13·0
14	Chaitrā (Tam. Chittirai).	14 16679	Tvashtri ...	14·16679	14·0
15	Svāti ..	15·17871	Vāyu ...	14·67275	14·5
16	Viśākhā (Tam. Visākam).	16·19062	Indrāgni	16·19062	16·0
17	Anurādhā (Tam. Anusham).	17·20273	Mitra ...	17·20253	17·0
18	Jyeshṭhā (Tam. Kottai)	18·21445	Indra ...	17·70849	17·5
19	Mula (Tam. Mūlam)	19·22636	Nirriti ..	18·72040	18·5
20	Pūrva-Āshāḍha (Tam. Pūrādam).	20·23828	Apah ...	19·73232	19·5
21	Uttara Āshāḍha (Tam. Uttirādam).	21·25019	Visvadēva Brahma.	21·25019	21·0 21·3217 (Abhijit)
22	Śrāvaṇa (Tam. Tiruvonam).	22·26210	Vishnu ...	22·26210	22·3217
23	Sravishta or Dhanishṭhā (Tam. Avittam).	23·27402	Vasava ...	23·27401	23·3217
24	Satabhishaj or Satataraka (Tam. Sadayam).	24 28593	Varuna .	23·77997	23·8217
25	Pūrva-Bhādrapada (Tam. Pūrāttadi).	25·29785	Aja Ekapad.	24·79188	24·8217
26	Uttara-Bhādrapada (Tam. Uttirattādi).	26·30976	Ahi Budhnya.	26·30975	26·8217
27	Revati	27·32167	Pushan ..	27·32167	27·8217

Yogas.

	Names of yogas.	Collective duration of yogas.
		Days.
1	Vishkamba.	0·94149
2	Priti .	1·88298
3	Ayushmat ..	2·82447
4	Saubhāgya.	3·76596
5	Sobhana ..	4·70745
6	Atigaṇḍa ...	5 64894
7	Sukarman ...	6·59043
8	Dhṛiti ...	7·53192
9	Sula ...	8·47341
10	Gaṇḍa .	9 41489
11	Vriddhi ...	10·35638
12	Dhṛuva ...	11·29787
13	Vyaghata .	12·23936
14	Harshana	13·18085
15	Vajra ...	14·12234
16	Siddhi .	15·06383
17	Vyatipāta ..	16·00532
18	Variyas .	16 94681
19	Parigha ...	17·88830
20	Śiva ...	18·82979
21	Siddha ...	19·77128
22	Sadhya ..	20 71277
23	Subha ...	21·65426
24	Śukla ..	22·59575
25	Brahman ...	23 53724
26	Indra ...	24·47878
27	Vaidhriti ...	25·42022

TABLE I (vii).

Karaṇas.

Kimstughna ...	1,	
Bava ...	2, 9, 16, 23, 30, 37, 44, 51,	58 = Sakuni.
Balava ...	3, 10, 17, 24, 31, 38, 45, 52,	59 = Nāga.
Kaulava ...	4, 11, 18, 25, 32, 39, 46, 53,	60 = Chatushpada.
Taitila ...	5, 12, 19, 26, 33, 40, 47, 54,	
Gara ...	6, 13, 20, 27, 34, 41, 48, 55,	
Banija ...	7, 14, 21, 28, 35, 42, 49, 56,	
Vishti (or Bhadra).	8, 15, 22, 29, 36, 43, 50, 57,	

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era.	Vaiśākha. Week-day.	Month	Day.	Fraction.	Jyeshṭha. Week-day.	Month.	Day.	Fraction.	Āshāḍha. Week-day.	Month.	Day.	Fraction.	Śrāvaṇa. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day.	Month.	Day.	Fraction.
3101	57	...	13M	·9831	9·9981	22·736	B.C. 1	3	Mr	28	·98	5	Ap	22	·51	7	My	22	·04	1	Je	20○	·57	3	Jl	20	·10
3102	58	..	14M	2419	28·6370	20·870	A.D. 1	2	Ap	11	·88	4	My	11	·41	5	Je	9●○	·94	7	Jl	9	.47	2	Au	8	·00
3103	59	..	14M	·5006	17·7453	17·027	2	7	Ap	1	·25	1	Ap	30○	·78	3	My	30	·31	4	Je	28	·84	6	Jl	28	·37
3104	60	...	14M	·7594	6·8536	13·184	3	4	Mr	21	·61	6	Ap	20○	·14	7	My	19	·67	2 3	Je Jl	18 17	·20 ·73	5	Au	16	·27
3105	61	..	14M	0181	25·4925	11·317	4	3	Ap	8●○	·51	5	My	8	·04	6	Je	6	·57	1	Jl	6	·10	2	Au	4	·63
3106	62	...	14M	·2769	14·6008	7·475	5	7	Mr	28●	·88	2	Ap	27	·41	3	My	26	·94	5	Je	25	·47	7	Jl	25	·00
3107	63	..	14M	·5356	3·7091	3·633	6	5	Mr	18	·24	6	Ap	16	·77	1 2	My Je	16 14	·31 ·84	4	Jl	14	·37	5	Au	12○	·90
3108	64		14M	·7944	22·3479	1·765	7	4	Ap	6	·14	5	My	5	·67	7	Je	4	·20	1	Jl	3	·73	3	Au	2○	·26
3109	65	.	14M	·0531	11·4562	25·477	8	1	Mr	25	·51	3	Ap	24	·04	4	My	23	·57	6	Je	22	·10	7	Jl	21○	·63
3110	66	...	14M	3119	0·5645	21·634	9	5 7	Mr Ap	14 13	·88 ·41	1	My	12	·94	3	Je	11	·47	5	Jl	11●	·00	6	Au	9	·53
3111	67	...	14M	5707	19·2034	19·767	10	4	Ap	2	·77	6	My	2	·30	7	My	31○	·83	2	Je	30●	·37	3	Jl	29	·90
3112	68	..	14M	·8294	8·3117	15·925	11	2	Mr	23	·14	3	Ap	21	·67	5	My	21○	·20	6	Je	19	·73	1 2	Jl Au	19 17	·26 ·79
3113	69	..	14M	·0882	26·9506	14·058	12	1	Ap	10	·04	2	My	9●	·57	4	Je	8	10	5	Jl	7	·63	7	Au	6	·16
3114	70	..	14M	·3469	16·0589	10·215	13	5	Mr	30○	·41	6	Ap	28●	·94	1	My	28	·47	3	Je	27	·00	4	Jl	26	·53
3115	71	...	14M	6057	5·1672	6·373	14	2	Mr	19○	·77	4	Ap	18●	30	5 7	My Je	17 16	·83 ·36	1	Jl	15	·89	3	Au	14	·43
3116	72	...	14M	·8644	23·8061	4·506	15	1	Ap	7	·67	3	My	7	·20	4	Je	5	·73	6	Jl	5	·26	7	Au	3	·79
3117	73	...	14M	·1232	12·9144	0·663	16	6	Mr	27	·04	7	Ap	25	·57	2	My	25	·10	3	Je	23	·63	5	Jl	23	·16
3118	74	..	14M	·3820	2·0227	24·375	17	3	Mr	16	·40	4 6	Ap My	14 14	·93 ·47	1	Je	13	·00	2	Jl	12○	·53	4	Au	11	·06
3119	75	...	14M	·6407	20·6616	22·508	18	2	Ap	4	·30	3	My	3	·83	5	Je	2	·36	6	Jl	1●○	·89	1	Jl	31	·42
3120	76	...	14M	·8995	9·7699	18·665	19	6	Mr	24	·67	1	Ap	23	·20	2	My	22	·73	4	Je	21●○	·26	5	Jl	20	·79
3121	77		14M	·1582	28·4088	16·799	20	5	Ap	11	·57	7	My	11○	·10	1	Je	9●	·63	3	Jl	9	·16	4	Au	7	·69
3122	78	..	14M	·4170	17·5171	12·956	21	2	Mr	31	·93	4	Ap	30○	·46	5	My	29	·99	7	Je	28	·53	2	Jl	28	·06
3123	79	...	14M	·6757	6·6254	9·113	22	7	Mr	21	·30	1	Ap	19●○	·83	3	My	19	·36	4 6	Je Jl	17 17	·89 ·42	7	Au	15	·95
3124	80	.	14M	·9345	25·2643	7·246	23	6	Ap	9	·20	7	My	8	·73	2	Je	7	·26	3	Jl	6	·79	5	Au	5	·32
3125	81	...	14M	·1932	14·3726	3·404	24	3	Mr	28	·57	5	Ap	27	·10	6	My	26	·63	1	Je	25	·16	2	Jl	24	·69
3126	82	...	14M	·4520	3·4809	27·115	25	7	Mr	17	·93	2	Ap	16	·46	3 5	My Je	15 14	·99 ·52	7	Jl	14	·05	1	Au	12○	·59
*3127	83	.	14M	·7108	22·1197	25·249	26	6	Ap	5	·83	1	My	5	·36	2	Je	3	·89	4	Jl	3	·42	5	Au	1○	·95
3128	84	...	14M	9695	11·2280	21·406	27	4	Mr	26	·20	5	Ap	24	·73	7	My	24	·26	1	Je	22	·79	3	Jl	22●	·32
3129	85	..	14M	·2283	0·3363	17·563	28	1 3	Mr Ap	14 13	·56 ·09	4	My	12	·63	6	Je	11○	·16	7	Jl	10●	·69	2	Au	9	·22
3130	86	...	14M	·4870	18·9752	15·696	29	7	Ap	2	·46	1	My	1	·99	3	My	31○	·52	5	Je	30	·05	6	Jl	29	·58
3131	87		14M	·7458	8·0835	11·854	30	4	Mr	22	83	6	Ap	21	·36	7	My	20●○	·89	2	Je	19	·42	3 5	Jl Au	18 17	·95 ·48
3132	88	..	15M	·0045	26·7224	9·987	31	3	Ap	10○	·73	5	My	10●	·26	6	Je	8	·79	1	Jl	8	32	2	Au	6	·85
3133	89	...	14M	·2633	15·8307	6·144	32	1	Mr	30○	·09	2	Ap	28●	·62	4	My	28	·15	5	Je	26	·69	7	Jl	26	·22
3134	90	.	14M	·5221	4·9390	2·301	33	5	Mr	19○	·46	6	Ap	17	·99	1 3	My Je	17 16	·52 ·05	4	Jl	15	58	6	Au	14	·11
3135	91		14M	·7808	23·5779	0·435	34	4	Ap	7	·36	5	My	6	·89	7	Je	5	·42	1	Jl	4	·95	3	Au	3	·48
3136	92	...	15M	·0396	12·6862	24·146	35	1	Mr	27	·73	3	Ap	26	·26	4	My	25	·79	6	Je	24	·32	7	Jl	23○	·85
3137	93	...	14M	·2983	1·7945	20·304	36	6	Mr	16	·09	7 2	Ap My	14 14	·62 ·15	3	Je	12	·68	5	Jl	12●○	·21	6	Au	10	·75
3138	94	.	14M	5571	20·4334	18·437	37	4	Ap	3	·99	6	My	3	·52	1	Je	2	·05	2	Jl	1●○	·58	4	Jl	31	·11
3139	95	...	14M	·8158	9·5417	14·594	38	2	Mr	24	·36	3	Ap	22	·89	5	My	22	42	6	Je	20●	·95	1	Jl	20	·48
3140	96	...	15M	·0746	28·1806	12·727	39	1	Ap	12	·25	2	My	11○	·79	4	Je	10	·32	5	Jl	9	·85	7	Au	8	·38
3141	97	...	14M	·3334	17·2889	8·885	40	5	Mr	31	·62	7	Ap	30●○	·15	1	My	29	·68	3	Je	28	·21	4	Jl	27	74
3142	98	..	14M	·5921	6·3972	5·043	41	2	Mr	20	·99	4	Ap	19●	·52	6	My	19	·05	7 2	Je Jl	17 17	·58 ·11	3	Au	15	·64
3143	99	.	14M	·8509	25·0361	3·175	42	1	Ap	8	·89	3	My	8	·42	4	Je	6	·95	6	Jl	6	·48	1	Au	5	·01
3144	100	...	15M	·1096	14·1443	26·887	43	6	Mr	29	·25	7	Ap	27	·78	2	My	27	·31	3	Je	25	·85	5	Jl	25	·38
3145	101	.	14M	·3684	3·2526	23·044	44	3	Mr	17	·62	5	Ap	16	·15	6 1	My Je	15 14	·68 ·21	2	Jl	13	·74	4	Au	12○	·27
3146	102	...	14M	·6271	21·8915	21·178	45	2	Ap	5	·52	4	My	5	·05	5	Je	3	·58	7	Jl	3	·11	1	Au	1●	·64
3147	103	...	14M	·8859	10·9998	17·335	46	6	Mr	25	·88	1	Ap	24	·42	2	My	23	·95	4	Je	22○	·48	6	Jl	22●	·01
3148	104	...	15M	·1446	0·1081	13·493	47	4 5	Mr Ap	15 13	·25 ·78	7	My	13	·31	1	Je	11○	·84	3	Jl	11	·37	4	Au	9	·91
3149	105	..	14M	·4034	18·7470	11·625	48	3	Ap	2	·15	4	My	1	·68	6	My	31●○	·21	7	Je	29	·74	2	Jl	29	·27
3150	106	.	14M	·6622	7·8553	7·783	49	7	Mr	22	·52	2	Ap	21○	·05	3	My	20●	·58	5	Je	19	·11	6 1	Jl Au	18 17	·64 17
3151	107	..	14M	·9209	26·4942	5·916	50	6	Ap	10○	·41	7	My	9●	·95	2	Je	8	·48	4	Jl	8	·01	5	Au	6	·54
3152	108	..	15M	·1797	15·6025	2·073	51	3	Mr	30○	·78	5	Ap	29	·31	6	My	28	·84	1	Je	27	·37	2	Jl	26	·90
3153	109	.	14M	·4384	4·7108	25·785	52	1	Mr	19●	·15	2	Ap	17	·68	4 5	My Je	17 15	·21 ·74	7	Jl	15	·27	1	Au	13	·80
3154	110		14M	·6972	23·3497	23·918	53	7	Ap	7	·05	1	My	6	·58	3	Je	5	·11	4	Jl	4	·64	6	Au	3○	·17
3155	111	...	14M	·9559	12·4580	20·075	54	4	Mr	27	·41	5	Ap	25	·94	7	My	25	·47	2	Je	24	·01	3	Jl	23●○	·54

* Ending moments of tithis by Ārya and Sūrya siddhāntas are the same.

rom 1 B.C. to A.D. 500 (Sūrya siddhānta).*

Āśvina.				Kārttika.				Mārgaśīrsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
4	Au	18	·63	7	O	16	·69	2	N	15	·23	Pausha. Kshaya.					3	D	14○	·76	1	5	Jr	13	·29	6	F	11	·82
6	S	17	·16																							1	Mr	13	·35
3	S	6	·53	5	O	6	·06	6	N	4	·59	1	D	4	·12	2	2	Jr	2	·65		4	F	1	·18	5	Mr	2	·71
7	Au	26	·90	2	S	25	·43	3	O	24○	·96	5	N	23●	·49		7	D	23	·02	3	1	Jr	21	55	3	F	20	·08
6	S	14	·80	1	O	14○	·33	2	N	12	·86	4	D	12	·39	4	5	Jr	10	·92		7	F	9	·45	1	Mr	9	·98
4	S	3	·16	5	O	2○	·69	7	N	1	·22	1	N	30	·75		3	D	30	·29	5	4	Jr	28	·82	6	F	27	·35
1	Au	23	·53	3	S	22●	·06	4	O	21	·59	6	N	20	·12		7	D	19	·65	6	2	Jr	18	·18	3	F	16○	·71
7	S	11●	·43	1	O	10	·96	3	N	9	49	5	D	9	·02	7	6	Jr	7	55		1	F	6●○	·08	2	Mr	7	·61
4	Au	31●	·79	6	S	30	·33	7	O	29	·86	2	N	28	·39		3	D	27	·92	8	5	Jr	26●○	·45	6	F	24	·98
2	Au	20	·16	3	S	18	·69	5	O	18	·22	6	N	16	·75		1	D	16	·28	9	2	Jr	14●	·81	4	F	13	·35
1	S	8	·06	2	O	7	·59	4	N	6	·12	5	D	5○	·65	10	7	Jr	4	·18		1	F	2	·71	3	Mr	4	·24
5	Au	28	·43	6	S	26	·96	1	O	26	·49	3	N	25●○	·02		4	D	24	·55	11	6	Jr	23	·08	7	F	21	·61
4	S	16	·32	5	O	15	·85	7	N	14●○	·39	1	D	13	·92	12	3	Jr	12	·45		4	F	10	·98	6	Mr	11	·51
1	S	4	·69	3	O	4	·22	4	N	2	·75	6	D	2	·28		7	D	31	81	13	2	Jr	30	·34	3	F	28	·87
6	Au	25	·06	7	S	23○	·59	2	O	23	·12	3	N	21	·65		5	D	21	·18	14	6	Jr	19	·71	1	F	18	·24
4	S	12○	·96	6	O	12	·49	1	N	11	·02	2	D	10	·55	15	4	Jr	9	·08		5	F	7	·61	7	Mr	9○	·14
2	S	2●○	·32	3	O	1	·85	5	O	31	·38	6	N	29	·91		1	D	29	·45	16	2	Jr	27	·98	4	F	26	·51
6	Au	21●	·69	1	S	20	·22	2	O	19	·75	4	N	18	·28		5	D	17	·81	17	7	Jr	16○	·34	1	F	14●	·87
5	S	9	·59	7	O	9	·12	1	N	7	·65	3	D	7	·18	18	4	Jr	5○	·71		6	F	4	·24	7	Mr	5	·77
2	Au	29	·95	4	S	28	·49	6	O	28	·02	7	N	26	·55		2	D	26○	·08	19	3	Jr	24	·61	5	F	23	·14
7	Au	19	·32	3	O	17	·38	4	N	15	·91	6	D	15●	·44	20	7	Jr	13	·97		2	F	12	·51	4	Mr	13	·04
1	S	17	·85													21	5	Jr	2	·34		6	Jr	31	·87	1	Mr	2	·40
6	S	6	·22	7	O	5	·75	2	N	4○	·28	3	D	3●	·81		2	D	22	·71	22	4	Jr	21	·24	5	F	19	·77
3	Au	26	·59	5	S	25	·12	6	O	24○	·65	1	N	23●	·18														
2	S	14	·48	4	O	14○	·01	5	N	12	·55	7	D	12	·08	23	1	Jr	10	·61		3	F	9	14	4	Mr	10	·67
6	S	3	·85	1	O	3	·38	2	N	1	·91	4	D	1	·44		5	D	30	·97	24	7	Jr	29	·50	2	F	28○	·03
4	Au	23○	·22	5	S	21●	·75	7	O	21	·28	1	N	19	·81		3	D	19	·34	25	4	Jr	17	·87	6	F	16○	·40
3	S	11●	·12	4	O	10	·65	6	N	9	·18	7	D	8	·71	26	2	Jr	7	·24		3	F	5●○	·77	5	Mr	7	·30
7	Au	31	·48	2	S	30	·01	3	O	29	·54	5	N	28	·07		6	D	27	·61	27	1	Jr	26●	·14	2	F	24	·67
4	Au	20	·85	6	S	19	·38	7	O	18	·91	2	N	17	·44		3	D	16○	97	28	5	Jr	15	·50	7	F	14	·03
3	S	7	·75	5	O	7	·28	6	N	5	·81	1	D	5○	·34	29	2	Jr	3	87		4	F	2	·40	5	Mr	3	·93
1	Au	28	·11	2	S	26	·65	4	O	26	·18	5	N	24●○	·71		7	D	24	·24	30	1	Jr	22	·77	3	F	21	·30
7	S	16	·01	1	O	15	·54	3	N	14●	·07	4	D	13	·60	31	6	Jr	12	·13		7	F	10	·67	2	Mr	12	·20
4	S	5	·38	5	O	4○	·91	7	N	3	·44	1	D	2	·97	32	3	Jr	1	50		5	Jr	31	03	6	F	29	·56
1	Au	24	·75	3	S	23○	·28	4	O	22	·81	6	N	21	·34		7	D	20	·87	33	2	Jr	19	·40	3	F	17	·93
7	S	12●○	·64	2	O	12	·17	3	N	10	·71	5	D	10	·24	34	6	Jr	8	·77		1	F	7	·30	2	Mr	8●	·83
5	S	2●	·01	6	O	1	·54	1	O	31	·07	2	N	29	·60		4	D	29	·13	35	5	Jr	27○	·66	7	F	26	·19
2	Au	22	·38	3	S	20	·91	5	O	20	·44	6	N	18	·97		1	D	18	·50	36	3	Jr	17○	·03	4	F	15●	·56
1	S	9	·28	2	O	8	·81	4	N	7	·34	5	D	6	·87	37	7	Jr	5○	·40		1	F	3	·93	3	Mr	5	·46
5	Au	29	64	7	S	28	·17	1	O	27	·70	3	N	26	·23		4	D	25●	·77	38	6	Jr	24	·30	7	F	22	·83
3	Au	19	·01	6	O	17	·07	7	N	15○	·60	2	D	15	·13	39	3	Jr	13	·66		5	F	12	19	6	Mr	13	·72
4	S	17	·54													40	1	Jr	3	·03		2	F	1	·56	4	Mr	2	·09
1	S	6	·91	3	O	6	·44	4	N	4○	·97	6	D	4●	·50		5	D	22	40	41	6	Jr	20	·93	1	F	19	·46
6	Au	26	·27	7	S	24	·81	2	O	24○	·34	3	N	22	·87														
5	S	14	·17	6	O	13●	·70	1	N	12	·23	2	D	11	·76	42	4	Jr	10	·29		5	F	8	·83	7	Mr	10○	·36
2	S	3○	·54	4	O	3●	·07	5	N	1	·60	7	D	1	·13		1	D	30	66	43	3	Jr	29	19	4	F	27●○	72
6	Au	23○	·91	1	S	22	·44	2	O	21	·97	4	N	20	·50		6	D	20	·03	44	7	Jr	18	·56	2	F	17●○	·09
5	S	10	·80	7	O	10	·33	1	N	8	·87	3	D	8	·40	45	4	Jr	6	·93		6	F	5	·46	7	Mr	6	·99
3	Au	31	·17	4	S	29	·70	6	O	29	·23	7	N	27	·76		2	D	27○	·29	46	3	Jr	25	·82	5	F	24	·35
7	Au	20	·54	2	S	19	·07	3	O	18	·60	5	N	17	·13		6	D	16●○	·66	47	1	Jr	15	·19	2	F	13	·72
6	S	8	·44	7	O	7	·97	2	N	6	·50	4	D	6○	·03	48	5	Jr	4	·56		7	F	3	·09	1	Mr	3	·62
3	Au	27	·80	5	S	26	·33	6	O	25	·86	1	N	24●	·39		2	D	23	·93	49	4	Jr	22	·46	5	F	20	·99
2	S	15	·70	4	O	15○	·23	5	N	13	·76	7	D	13	·29	50	1	Jr	11	82		3	F	10	35	4	Mr	11	·88
7	S	5	·07	1	O	4○	·60	3	N	3	·13	4	D	2	·66	51	6	Jr	1	·19		7	Jr	30	·72	2	Mr	1	·25
4	Au	25	·43	5	S	23●○	·97	7	O	23	50	2	N	22	·03		3	D	21	·56	52	5	Jr	20	09	6	F	18	62
3	S	12	·33	4	O	11	·86	6	N	10	·39	7	D	9	·92	53	2	Jr	8	·45		3	F	6○	·99	5	Mr	8●	·52
7	S	1	·70	2	O	1	·23	3	O	30	·76	5	N	29	·29		6	D	28	·82	54	1	Jr	27○	·35	2	F	25●	·88
5	Au	22	·07	6	S	20	·60	1	O	20	·13	2	N	18	·66		4	D	18	·19	55	5	Jr	16○	·72	7	F	15	·25

*For tithis by Brahma siddhānta, add algebraically – ·02 to the above.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day	First new moon in solar year	Anomaly of first new moon.	Christian era	Vaiśākha. Week-day	Month	Day	Fraction	Jyeshtha. Week-day.	Month	Day.	Fraction	Āshāḍha. Week-day	Month.	Day	Fraction	Śrāvaṇa. Week-day	Month	Day.	Fraction.	Bhādrapada. Week-day.	Month.	Day	Fraction.
							A.D.																				
3156	112	...	15M	·2147	1·5663	16·238	55	1	Mr	16	·78	8 4	Ap My	15 14	·31 ·84	6	Je	13	·87	7	Jl	12●○	·90	2	Au	11	·43
3157	113	.	14M	·4735	20·2052	14·366	56	7	Ap	3	·68	2	My	3	·21	3	Je	1	·74	5	Jl	1●	·27	6	Jl	30	·80
3158	114	..	14M	·7822	9·3135	10·523	57	5	Mr	24	·05	6	Ap	22	·58	1	My	22○	11	2	Je	20	·64	4	Jl	20	·17
3159	115	...	14M	·9910	27·9524	8·656	58	3	Ap	11	·94	5	My	11●○	47	7	Je	10	·00	1	Jl	9	·53	3	Au	8	·07
3160	116	...	15M	·2497	17·0607	4·814	59	1	Ap	1	·31	2	Ap	30●	·84	4	My	30	·37	5	Je	28	·90	7	Jl	28	·43
3161	117	..	14M	·5085	6·1690	0·971	60	5	Mr	20○	·68	7	Ap	19	·21	1	My	18	·74	3 4	Je Jl	17 16	·27 ·80	6	Au	15	·83
3162	118	...	14M	·7672	24·8078	26·659	61	4	Ap	8	·57	6	My	8	·11	7	Je	6	·64	2	Jl	6	·17	3	Au	4	·70
3163	119		15M	·0260	13·9161	22·816	62	1	Mr	28	·94	3	Ap	27	·47	5	My	27	·00	6	Je	25	·53	1	Jl	25	·06
3164	120	...	15M	·2848	3·0244	18·973	63	6	Mr	18	·31	7	Ap	16	·84	2 3	My Je	16 14	·37 ·90	5	Jl	14	·43	6	Au	12	·96
3165	121	...	14M	·5435	21·6633	17·107	64	5	Ap	5	·21	6	My	4	74	1	Je	3	·27	2	Jl	2○	·80	4	Au	1●	·33
3166	122	...	14M	·8023	10·7716	13·264	65	2	Mr	25	·57	4	Ap	24	·10	5	My	23	·63	7	Je	22○	·17	1	Jl	21	·70
3167	123		15M	·0610	29·4105	11·397	66	1	Ap	13	·47	3	My	13	·00	4	Je	11○	·53	6	Jl	11	·06	7	Au	9	·59
3168	124	...	15M	·3198	18·5188	7·554	67	5	Ap	2	·84	7	My	2○	·37	1	My	31●	·90	3	Je	30	·43	4	Jl	29	·96
3169	125		14M	·5785	7·6271	3·712	68	3	Mr	22	·21	4	Ap	20○	·74	6	My	20●	·27	7 2	Je Jl	18 18	·80 ·33	3	Au	16	·86
3170	126	...	14M	·8373	26·2660	1·845	69	2	Ap	10○	·10	3	My	9	·63	5	Je	8	·16	6	Jl	7	·69	1	Au	6	·22
3171	127	..	15M	·0960	15·3748	25·557	70	6	Mr	30	·47	1	Ap	29	·00	2	My	28	·53	4	Je	27	·06	5	Jl	26	·59
3172	128	...	15M	·3548	4·4826	21·714	71	3	Mr	19●	·84	5	Ap	18	·37	6 1	My Je	17 16	·90 ·43	2	Jl	15	·96	4	Au	14○	·49
3173	129	...	14M	·6136	23·1215	19·847	72	2	Ap	6	·73	4	My	6	·27	5	Je	4	·80	7	Jl	4	·33	1	Au	2●○	·86
3174	130	...	14M	·8723	12·2298	16·004	73	7	Mr	27	·10	1	Ap	25	·63	3	My	25	·16	4	Je	23	·69	6	Jl	23●○	·22
3175	131	...	14M	·1311	1·3881	12·163	74	4	Mr	16	·47	6 7	Ap My	15 14	·00 ·53	2	Je	13	·06	3	Jl	12●	·59	5	Au	11	·12
3176	132	...	15M	·3898	19·9770	10·295	75	3	Ap	4	·37	4	My	3	·90	6	Je	2○	·43	7	Jl	1	·96	2	Jl	31	·49
3177	133	..	14M	·6486	9·0853	6·452	76	7	Mr	23	·73	2	Ap	22	·26	3	My	21●○	79	5	Je	20	·33	6	Jl	19	·86
3178	134	...	14M	·9073	27·7242	4·585	77	6	Ap	11	·63	1	My	11	·16	2	Je	9	·69	4	Jl	9	·22	5	Au	7	·72
3179	135	.	15M	·1661	16·8825	0·743	78	4	Ap	1○	·00	5	Ap	30●	·53	7	My	30	·06	1	Je	28	·59	3	Jl	28	·12
3180	136	1	15M	·4249	5·9408	24·455	79	1	Mr	21○	·36	2	Ap	19	·90	4	My	19	·43	5 7	Je Jl	17 17	·96 ·49	2	Au	16	·02
3181	137	2	14M	·6836	24·5796	22·588	80	7	Ap	8	·26	1	My	7	·79	3	Je	6	·32	4	Jl	5	·85	6	Au	4	·39
3182	138	3	14M	·9424	13·6879	18·745	81	4	Mr	28	·63	6	Ap	27	·16	7	My	26	·69	2	Je	25	·22	3	Jl	24	·75
3183	139	4	15M	·2011	2·7962	14·902	82	2	Mr	18	·00	3 5	Ap My	16 16	53 ·06	6	Je	14	·59	1	Jl	14○	·12	2	Au	12●	·65
3184	140	5	15M	·4599	21·4351	13·036	83	7	Ap	5	·89	2	My	5	·43	3	Je	3	·96	5	Jl	3○	·49	7	Au	2●	·02
3185	141	6	14M	·7186	10·5434	9·193	84	5	Mr	25	·26	6	Ap	23	·79	1	My	23	·32	2	Je	21○	·85	4	Jl	21	·38
3186	142	7	14M	·9774	29·1823	7·326	85	4	Ap	13	·16	5	My	12○	69	7	Je	11●	·22	1	Jl	10	·75	3	Au	9	·28
3187	143	8	15M	·2362	18·2906	3·483	86	1	Ap	2	·53	3	My	2○	·06	4	My	31●	·59	6	Je	30	·12	7	Jl	29	·65
3188	144	9	15M	·4949	7·3989	27·195	87	5	Mr	22	·89	7	Ap	21○	·42	1	My	20	·95	3 5	Je Jl	19 19	48 ·02	6	Au	17	·55
3189	145	10	14M	·7537	26·0378	25·328	88	4	Ap	9●	·79	6	My	9	·32	7	Je	7	·85	2	Jl	7	·38	3	Au	5	·91
3190	146	11	15M	·0124	15·1461	21·486	89	2	Mr	30●	·16	3	Ap	28	·69	5	My	28	·22	6	Je	26	·75	1	Jl	26	·28
3191	147	12	15M	·2712	4·2544	17·643	90	6	Mr	19●	·52	1	Ap	18	·06	2 4	My Je	17 16	·59 ·12	5	Jl	15	·65	7	Au	14○	·18
3192	148	13	15M	·5299	23·6933	15·776	91	5	Ap	7	·42	6	My	6	·95	1	Je	5	·48	3	Jl	5	·01	4	Au	3●○	·54
3193	149	14	14M	·7887	12·0016	11·933	92	2	Mr	26	79	4	Ap	25	·32	5	My	24	·85	7	Je	23	·38	1	Jl	22●	·91
3194	150	15	15M	0474	1·1099	8·091	93	7 1	Mr Ap	16 14	·16 ·69	3	My	14	·22	4	Je	12○	75	6	Jl	12	·28	7	Au	10	·81
3195	151	16	15M	·3062	19·7488	6·224	94	6	Ap	4	·05	7	My	3	58	2	Je	2●○	·12	3	Jl	1	·65	5	Jl	31	·18
3196	152	17	15M	·5650	8·8571	2·381	95	3	Mr	24	·42	4	Ap	22	·95	6	My	22●○	·48	1	Je	21	·01	2 4	Jl Au	20 19	54 ·07
3197	153	18	14M	8237	27·4959	0·514	96	2	Ap	11	·32	3	My	10●	·85	5	Je	9	·38	6	Jl	8	·91	1	Au	7	·44
3198	154	19	15M	0825	16·6042	24·226	97	6	Mr	31●○	·39	1	Ap	30	·22	2	My	29	·75	4	Je	28	·28	5	Jl	27	·81
3199	155	20	15M	·3412	5·7125	20·383	98	4	Mr	21●○	·05	5	Ap	19	·58	7	My	19	·11	1 3	Je Jl	17 17	·64 ·18	4	Au	15	·71
3200	156	21	15M	·6000	24·3514	18·517	99	2	Ap	8	·95	4	My	8	·48	6	Je	7	·01	7	Jl	6	·54	2	Au	5	·07
3201	157	22	14M	·8587	13·4597	14·674	100	7	Mr	28	·32	1	Ap	26	·85	3	My	26	·38	4	Je	24	·91	6	Jl	24○	·44
3202	158	23	15M	·1175	2·5680	10·831	101	4	Mr	17	·68	6 7	Ap My	16 15	·22 ·75	2	Je	14	·28	3	Jl	13○	·81	5	Au	12●	·34
3203	159	24	15M	·3763	21·2069	8·964	102	3	Ap	5	·58	5	My	5	·11	6	Je	3	·64	1	Jl	3○	·17	2	Au	1	·70
3204	160	25	15M	·6350	10·3152	5·122	103	7	Mr	25	·95	2	Ap	24	·48	4	My	24	·01	5	Je	22●	·54	7	Jl	22	·07
3205	161	26	14M	·8938	28·9541	3·255	104	6	Ap	12	·85	1	My	12○	·38	2	Je	10●	·91	4	Jl	10	·44	5	Au	8	·97
3206	162	27	15M	·1525	18·0624	26·967	105	4	Ap	2	21	5	My	1○	·74	7	My	31	·28	1	Je	29	·81	3	Jl	29	34
3207	163	28	15M	·4113	7·1707	23·124	106	1	Mr	23	·58	3	Ap	21●	·11	4	My	20	·64	6 7	Je Jl	19 18	·17 ·70	2	Au	17	·23
3208	164	29	15M	·6700	25·8096	21·257	107	7	Ap	10●	·48	2	My	10	·01	3	Je	8	·54	5	Jl	8	·07	6	Au	6	·60
3209	165	30	14M	·9288	14·9179	17·415	108	4	Mr	29●	·85	6	Ap	28	·38	7	My	27	·91	2	Je	26	·44	3	Jl	25	·97

* Ending moments of tithis by Ārya and Sūrya siddhāntas are the same.

from 1 B.C. to A.D. 500 (Sûrya siddhânta)*—cont.

Âśvina.				Kârttika.				Mârgaśîrsha.				Pausha.				A.D.	Mâgha.				A.D.	Phâlguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
3	S	9	·96	5	O	9	·49	7	N	8	·03	1	D	7	·56	**56**	3	Jr	6	·09		4	F	4	·62	6	Mr	5	·15
1	Au	29	·33	2	S	27	·86	4	O	27	·39	5	N	25○	·92		7	D	25●	·45	**57**	1	Jr	28	·98	3	F	23	·51
5 7	Au S	18 17	·70 ·23	1	O	16	·76	3	N	15○	·29	4	D	14	·82	**58**	6	Jr	13	·35		7	F	11	·88	2	Mr	13	·41
4	S	6	·60	6	O	6	·13	7	N	4○	·66	2	D	4	19	**59**	3	Jr	2	·72		5	F	1	·25	6	Mr	2	·78
1	Au	26	·96	3	S	25	·49	5	O	25	·02	6	N	23	·55		1	D	23	·09	**60**	2	Jr	21	·62	4	F	20	·15
7	S	13○	·86	2	O	13●	·39	3	N	11	·92	5	D	11	·45	**61**	6	Jr	9	·98		1	F	8	·51	3	Mr	10●○	·04
5	S	3○	·23	6	O	2●	·76	1	N	1	·29	2	N	30	·82		4	D	30	·35	**62**	5	Jr	28	·88	7	F	27●○	41
2	Au	23○	·59	4	S	22	·18	5	O	21	·66	7	N	20	·19		1	D	19	·72	**63**	3	Jr	18	·25	4	F	16●	·78
1	S	11	·49	3	O	11	·02	4	N	9	·55	6	D	9	·08	**64**	7	Jr	7○	·61		2	F	6	·15	3	Mr	6	·68
5	Au	30	·86	7	S	29	·39	1	O	28	·92	3	N	27	·45		4	D	26○	·98	**65**	6	Jr	25	·51	1	F	24	·04
3	Au	20	·23	4	S	18	·76	6	O	18	·29	7	N	16	·82		2	D	16●○	·35	**66**	3	Jr	14	·88	5 6	F Mr	13 14	·41 ·94
2	S	8	·12	3	O	7	·65	5	N	6	·19	6	D	5	·72	**67**	1	Jr	4	·25		2	F	2	·78	4	Mr	4	·31
6	Au	28	·49	1	S	27	·02	2	O	26○	·55	4	N	25	·08		5	D	24	·61	**68**	7	Jr	23	·14	1	F	21	·67
5	S	15	·39	6	O	14○	·92	1	N	13	·45	2	D	12	·98	**69**	4	Jr	11	·51		6	F	10	·04	7	Mr	11	·5
2	S	4	·76	4	O	4●○	·29	5	N	2	·82	7	D	2	·35		1	D	31	·88	**70**	3	Jr	30	·41	4	F	28	·94
7	Au	25	·12	1	S	23●	·65	3	O	23	·18	4	N	21	·71		6	D	21	·25	**71**	7	Jr	19	·78	2	F	18○	·31
6	S	13	·02	7	O	12	·55	2	N	11	·08	3	D	10	·61	**72**	5	Jr	9	·14		6	F	7○	·67	1	Mr	8	·20
3	S	1	·39	4	S	30	·92	6	O	30	·45	7	N	28	·98		2	D	28	·51	**73**	4	Jr	27○	·04	5	F	25	·57
7	Au	21	·75	2	S	20	·29	3	O	19	·82	5	N	18	·35		6	D	17	·88	**74**	1	Jr	16	·41	2	F	14	·94
6	S	9	·65	1	O	9	·18	2	N	7	·71	4	D	7○	·24	**75**	5	Jr	5●	·77		7	F	4	·31	1	Mr	5	·84
4	Au	30	·02	5	S	28	·55	7	O	28	·08	1	N	26○	·61		3	D	26●	·14	**76**	4	Jr	24	·67	6	F	23	·20
1 2	Au S	18 16	·39 ·92	4	O	16	·45	5	N	14○	·98	7	D	14	·51	**77**	2	Jr	13	·04		3	F	11	·57	5	Mr	13	·10
7	S	6	·28	1	O	5	·81	3	N	4	·35	4	D	3	·88	**78**	6	Jr	2	·41		7	Jr	31	·94	2	Mr	2	·47
4	Au	26	·65	6	S	25○	·18	7	O	24●	·71	2	N	23	·24		3	D	22	·77	**79**	5	Jr	21	·30	6	F	19	·83
3	S	14○	·55	5	O	14●	·08	6	N	12	·61	1	D	12	·14	**80**	2	Jr	10	·67		4	F	9	·20	5	Mr	9●○	·73
7	S	2○	·92	2	O	2	·45	3	O	31	·98	5	N	30	·51		7	D	30	04	**81**	1	Jr	28	·57	3	F	27●	·10
5	Au	23●	·28	6	S	21	·81	1	O	21	·34	2	N	19	·87		4	D	19	·41	**82**	5	Jr	17○	·94	7	F	16	·47
4	S	11	·18	5	O	10	·71	7	N	9	·24	1	D	8	·77	**83**	3	Jr	7○	30		4	F	5	·83	6	Mr	7	·36
1	Au	31	·55	3	S	30	·08	4	O	29	·61	6	N	28	·14		7	D	27●○	·67	**84**	2	Jr	26	·20	3	F	24	·73
5	Au	19	.91	7	S	18	·45	1	O	17	·98	3	N	16	·51		5	D	16●	·04	**85**	6	Jr	14	·57	1 2	F Mr	13 14	·10 ·6
4	S	7	·81	6	O	7	·34	7	N	5○	·87	2	D	5	·40	**86**	3	Jr	3	·93		5	F	2	·46	7	Mr	4	·00
2	Au	28	·18	3	S	26	·71	5	O	26○	·24	6	N	24	·77		1	D	24	30	**87**	2	Jr	22	·83	4	F	21	·36
1	S	16	·08	2	O	15●○	·61	4	N	14	·14	5	D	13	·67	**88**	7	Jr	12	·20		1	F	10	·73	3	Mr	11	·26
5	S	4	·44	6	O	3●	·97	1	N	2	·50	3	D	2	·04		4	D	31	·57	**89**	6	Jr	30	·10	7	F	28○	·63
2	Au	24○	·81	4	S	23	·34	5	O	22	·87	7	N	21	·40		1	D	20	·93	**90**	3	Jr	19	·46	4	F	17○	·99
1	S	12	·71	3	O	12	·24	4	N	10	·77	6	D	10	·30	**91**	7	Jr	8	·83		2	F	7○	36	3	Mr	8	·89
6	S	2	·08	7	O	1	·61	2	O	31	·14	3	N	29	·67		5	D	29	·20	**92**	6	Jr	27●	73	1	F	26	·26
3	Au	21	·44	4	S	19	·97	6	O	19	·50	1	N	18	·03		2	D	17○	56	**93**	4	Jr	16	·10	5	F	14	·63
2	S	9	·34	3	O	8	·87	5	N	7	·40	6	D	6○	·93	**94**	1	Jr	5●	·46		2	F	3	·99	4	Mr	5	·52
6	Au	29	·71	1	S	28	·24	2	O	27	77	4	N	26○	·30		5	D	25	·83	**95**	7	Jr	24	·36	1	F	22	·89
5	S	17	·60	7	O	17	·14	1	N	15	·67	3	D	15	·20	**96**	4	Jr	13	·73		6	F	12	·26	7	Mr	12	·79
2	S	5	·97	4	O	5○	·50	6	N	4●	03	7	D	3	·56	**97**	2	Jr	2	·09		3	Jr	31	·62	5	Mr	2	·16
7	Au	26	·34	1	S	24○	·87	3	O	24	·40	4	N	22	·93		6	D	22	·46	**98**	7	Jr	20	·99	2	F	19	52
6	S	14○	·24	7	O	13	·77	2	N	12	·30	3	D	11	·83	**99**	5	Jr	10	·36		6	F	8	·89	1	Mr	10	·42
3	S	3●	·60	5	O	3	·13	6	N	1	·66	1	D	1	·20		2	D	30	73	**100**	4	Jr	29○	·26	5	F	27	·79
7	Au	22●	·97	2	S	21	·50	4	O	21	·03	5	N	19	·56		7	D	19	·09	**01**	1	Jr	17●○	·62	3	F	16	·15
6	S	10	·87	1	O	10	·40	2	N	8	·93	4	D	8	·46	**02**	5	Jr	6○	·99		7	F	5	·52	2	Mr	7	·05
4	Au	31	·24	5	S	29	·77	7	O	29	·30	1	N	27	·83		3	D	27●	·36	**03**	4	Jr	25	·89	6	F	24	42
1	Au	20	·60	3	S	19	·13	4	O	18	·66	6	N	17○	·19		7	D	16	·72	**04**	2	Jr	15	·26	3 5	F Mr	13 14	·79 ·32
7	S	7	·50	2	O	7	·03	3	N	5○	·56	5	D	5	·09	**05**	6	Jr	3	·62		1	F	2	·15	2	Mr	3	·68
4	Au	27	·87	6	S	26	·40	7	O	25●○	·93	2	N	24	·46		3	D	23	·99	**06**	5	Jr	22	·52	7	F	21	·05
3	S	15	·76	5	O	15	·30	6	N	13	·83	1	D	13	·36	**07**	2	Jr	11	·89		4	F	10	·42	5	Mr	11○	·95
1	S	5○	·13	2	O	4	·66	4	N	3	·19	5	D	2	·72	**08**	7	Jr	1	·25		1	Jr	30	·78	3	F	29○	·32
5	Au	24●○	·50	7	S	23	·03	1	O	22	·56	3	N	21	·09		4	D	20	·62	**09**	6	Jr	19	·15	7	F	17○	·68

For tithis by Brahma siddhânta add algebraically —·02 to the above.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era.	Vaiśākha. Week-day.	Month.	Day.	Fraction.	Jyeshṭha. Week-day.	Month.	Day.	Fraction.	Āshāḍha. Week-day.	Month.	Day.	Fraction.	Śrāvaṇa. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day.	Month.	Day.	Fraction.
							A.D.																				
3210	166	81	15M	·1876	4·0262	13·572	109	2	Mr	19	·21	3	Ap	17	·74	5 6	My Je	17 15	·27 ·80	1	Jl	15	·84	2	Au	13●○	·87
3211	167	32	15M	·4463	22·6651	11·705	110	1	Ap	7	·11	2	My	6	·64	4	Je	5	·17	5	Jl	4	·70	7	Au	8●	·28
3212	168	33	15M	·7051	11·7738	7·862	111	5	Mr	27	·48	7	Ap	26	·01	1	My	25	·54	3	Je	24○	·07	4	Jl	23	·60
3213	169	34	14M	·9638	0·8817	4·020	112	2 4	Mr Ap	15 14	·84 ·88	5	My	13	·91	7	Je	12●○	·44	1	Jl	11	·97	3	Au	10	·50
3214	170	35	15M	·2226	19·5206	2·153	113	1	Ap	3	·74	3	My	3	·27	4	Je	1●○	·80	6	Jl	1	·83	7	Jl	30	·86
3215	171	36	15M	·4813	8·6289	25·865	114	6	Mr	24	·11	7	Ap	22	·64	2	My	22●	·17	3	Je	20	·70	5 6	Jl Au	20 18	·23 ·76
3216	172	37	15M	·7401	27·2677	23·998	115	5	Ap	12○	·01	6	My	11	·54	1	Je	10	·07	2	Jl	9	·60	4	Au	8	·13
3217	173	38	14M	·9988	16·3760	20·155	116	2	Mr	31●○	·37	3	Ap	29	·90	5	My	29	·44	6	Je	27	·97	1	Jl	27	·50
3218	174	39	15M	·2576	5·4843	16·312	117	6	Mr	20●	·74	1	Ap	19	·27	2	My	18	·80	4 5	Je Jl	17 16	·83 ·86	7	Au	15	·39
3219	175	40	15M	·5164	24·1232	14·446	118	5	Ap	8	·64	7	My	8	·17	1	Je	6	·70	3	Jl	6	·23	4	Au	4○	·76
3220	176	41	15M	·7751	13·2815	10·608	119	3	Mr	29	·01	4	Ap	27	·54	6	My	27	·07	7	Je	25	·60	2	Jl	25○	·13
3221	177	42	15M	·0339	2·3398	6·760	120	7	Mr	17	37	1 3	Ap My	15 15	·90 ·43	4	Je	13	·96	6	Jl	13○	·50	1	Au	12	·08
3222	178	43	15M	·2926	20·9787	4·893	121	6	Ap	5	·27	7	My	4	·80	2	Je	3	·33	3	Jl	2●	·86	5	Au	1	·39
3223	179	44	15M	·5514	10·0870	1·051	122	3	Mr	25	·64	5	Ap	24	·17	6	My	23○	·70	1	Je	22●	·28	2	Jl	21	·76
3224	180	45	15M	·8101	28·7259	26·739	123	2	Ap	13	54	4	My	13○	·07	5	Je	11	·60	7	Jl	11	·13	1	Au	9	·66
3225	181	46	15M	·0689	17·8842	22·896	124	6	Ap	1	·90	1	My	1●	·43	2	My	30	·96	4	Je	29	·49	6	Jl	29	·02
3226	182	47	15M	·3277	6·9425	19·053	125	4	Mr	22○	·28	5	Ap	20●	·80	7	My	20	·33	1 3	Je Jl	18 18	·86 ·39	4	Au	16	·92
3227	183	48	15M	·5864	25·5814	17·176	126	3	Ap	10●	·17	4	My	9	·70	6	Je	8	·23	7	Jl	7	·76	2	Au	6	·29
3228	184	49	15M	·8452	14·6897	13·344	127	7	Mr	30	·53	2	Ap	29	·06	3	My	28	·60	5	Je	27	·13	6	Jl	26	·66
3229	185	50	15M	·1039	3·7980	9·501	128	4	Mr	18	·90	6	Ap	17	·43	7 2	My Je	16 15	·96 49	4	Jl	15	·02	5	Au	13	·55
3230	186	51	15M	·3627	22·4369	7·634	129	3	Ap	6	·80	5	My	6	·33	6	Je	4	·86	1	Jl	4○	·39	2	Au	2	·92
3231	187	52	15M	·6214	11·5452	3·791	130	1	Mr	27	17	2	Ap	25	·70	4	My	25	·23	5	Je	23●○	·76	7	Jl	23	·29
3232	188	53	15M	·8802	0·6535	27·503	131	5 7	Mr Ap	16 15	·53 ·06	1	My	14	·59	3	Je	13●○	12	4	Jl	12	·66	6	Au	11	*·19
3233	189	54	15M	·1389	19·2923	25·636	132	4	Ap	3	·43	5	My	2	·96	7	Je	1●	·49	2	Jl	1	·02	3	Jl	30	·55
3234	190	55	15M	·3977	8·4006	21·794	133	1	Mr	23	·80	3	Ap	22○	·33	4	My	21	·86	6	Je	20	·39	7 2	Jl Au	19 18	·92 ·45
3235	191	56	15M	·6565	27·0395	19·927	134	7	Ap	11●○	·70	2	My	11	·23	3	Je	9	·76	5	Jl	9	·29	6	Au	7	·82
3236	192	57	15M	9152	16·1478	16·084	135	5	Ap	1●○	·06	6	Ap	30	·59	1	My	30	·12	2	Je	28	·65	4	Jl	28	·18
3237	193	58	15M	·1740	5·2561	12·241	136	2	Mr	20	·43	3	Ap	18	·96	5	My	18	·49	7 1	Je Jl	17 16	·02 ·55	3	Au	15○	·08
3238	194	59	15M	·4327	23·8950	10·375	137	1	Ap	8	·83	2	My	7	·86	4	Je	6	·39	5	Jl	5	·92	7	Au	4○	·45
3239	195	60	15M	·6915	13·0033	6·532	138	5	Mr	28	·69	7	Ap	27	·22	1	My	26	·76	3	Je	25	·29	4	Jl	24○	·82
3240	196	61	15M	·9502	2·1116	2·689	139	3	Mr	18	·06	4 6	Ap My	16 16	·59 ·12	7	Je	14	·65	2	Jl	14	·18	3	Au	12	·71
3241	197	62	15M	·2090	20·7505	0·822	140	1	Ap	4	·96	3	My	4	·49	5	Je	3○	·02	6	Jl	2●	·55	1	Au	1	·08
3242	198	63	15M	·4678	9·8589	24·534	141	6	Mr	25	·33	7	Ap	23	·86	2	My	23○	·39	3	Je	21●	·92	5	Jl	21	·45
3243	199	64	15M	·7265	28·4977	22·667	142	5	Ap	13	·22	6	My	12●○	·75	1	Je	11	·28	2	Jl	10	·82	4	Au	9	·35
3244	200	65	15M	·9853	17·6060	18·825	143	2	Ap	2○	·59	4	My	2●	·12	5	My	31	·65	7	Je	30	·18	1	Jl	29	·71
3245	201	66	15M	·2140	6·7143	14·982	144	6	Mr	21○	·96	1	Ap	20●	·49	3	My	20	·02	4 6	Je Jl	18 18	·55 ·08	7	Au	16	·61
3246	202	67	15M	·5028	25·3582	13·115	145	5	Ap	9	·86	7	My	9	·39	1	Je	7	·92	3	Jl	7	·45	4	Au	5	·98
3247	203	68	15M	·7615	14·4615	9·272	146	3	Mr	30	·22	4	Ap	28	·75	6	My	28	·28	7	Je	26	·81	2	Jl	26	·34
3248	204	69	16M	·0208	3·5698	5·430	147	7	Mr	19	·59	2 3	Ap My	18 17	·12 ·65	5	Je	16	·18	6	Jl	15○	·71	1	Au	14	·24
3249	205	70	15M	·2791	22·2087	3·563	148	6	Ap	6	·49	1	My	6	·02	2	Je	4	·55	4	Jl	4●○	·08	5	Au	2	·61
3250	206	71	15M	·5378	11·3170	27·275	149	3	Mr	26	·85	5	Ap	25	·38	6	My	24	·92	1	Je	23●○	·45	2	Jl	22	·98
3251	207	72	15M	·7966	0·4253	28·432	150	1 2	Mr Ap	16 14	·22 ·75	4	My	14	·28	5	Je	12●	·81	7	Jl	12	·34	1	Au	10	·87
3252	208	73	16M	·0553	19·0641	21·565	151	7	Ap	4	·12	1	My	3○	·65	3	Je	2	·18	4	Jl	1	·71	6	Jl	31	·24
3253	209	74	15M	·3141	8·1724	17·728	152	4	Mr	23	·49	6	Ap	22●○	·02	7	My	21	·55	2	Je	20	·08	3 5	Jl Au	19 18	·61 ·14
3254	210	75	15M	·5728	26·8113	15·856	153	3	Ap	11●○	·38	4	My	10	·91	6	Je	9	·44	7	Jl	8	·98	2	Au	7	·51
3255	211	76	15M	·8316	15·9196	12·018	154	7	Mr	31●	·75	2	Ap	30	·28	3	My	29	·81	5	Je	28	·34	6	Jl	27	·87
3256	212	77	16M	·0904	5·0279	8·170	155	5	Mr	21	·12	6	Ap	19	·65	1 2	My Je	19 17	·18 ·71	4	Jl	17	·24	5	Au	15○	·77
3257	213	78	15M	·3491	23·6668	6·304	156	4	Ap	8	·02	5	My	7	·55	7	Je	6	·08	1	Jl	5	·61	3	Au	4○	·14
3258	214	79	15M	·6079	12·7751	2·461	157	1	Mr	28	·38	2	Ap	26	·91	4	My	26	·44	5	Je	24●	·97	7	Jl	24	·50
3259	215	80	15M	8666	1·8834	26·173	158	5	Mr	17	·75	7 1	Ap My	16 15	·28 ·81	3	Je	14○	·34	4	Jl	13●	·87	6	Au	12	·40
3260	216	81	16M	·1254	20·5223	24·306	159	4	Ap	5	·65	6	My	5	·18	7	Je	3○	·71	2	Jl	3	·24	3	Au	1	·77
3261	217	82	15M	·3841	9·6306	20·468	160	2	Mr	25	·01	3	Ap	23	·54	5	My	23●○	·07	6	Je	21	·61	1	Jl	21	·14
3262	218	83	15M	·6429	28·2695	18·596	161	7	Ap	12	·91	2	My	12●	·44	3	Je	10	·97	5	Jl	10	·50	7	Au	9	·03

* Ending moment of tithis are the same for Ārya and Sūrya siddhāntas.

from 1 B.C. to A.D. 500 (Sūrya siddhānta)*—*cont.*

Āśvina. Week-day.	Month.	Day.	Fraction.	Kārttika. Week-day.	Month.	Day.	Fraction.	Mārgaśīrsha. Week-day.	Month.	Day.	Fraction.	Pausha. Week-day.	Month.	Day.	Fraction.	A.D.	Māgha. Week-day.	Month.	Day.	Fraction.	A.D.	Phālguna. Week-day	Month.	Day.	Fraction.	Chaitra. Week-day	Month.	Day.	Fraction.
4	S	12	·40	5	O	11	·93	7	N	10	·46	1	D	9	99	**10**	3	Jr	8	52		5	F	7	·05	6	Mr	8	·58
1	S	1	·76	3	O	1	·29	4	O	30	·82	6	N	29	·36		7	D	28○	·89	**11**	2	Jr	27●	·42	3	F	25	·95
6	Au	22	·13	7	S	20	·66	2	O	20	·19	3	N	18	·72		5	D	18○	25	**12**	6	Jr	16	·78	1	F	15	·31
5	S	9	·03	6	O	8	·56	1	N	7	·09	2	D	6○	·62	**13**	4	Jr	5	·15		5	F	3	·68	7	Mr	5	21
2	Au	29	·40	3	S	27	·93	5	O	27	·46	6	N	25●	·99		1	D	25	52	**14**	3	Jr	24	·05	4	F	22	58
1	S	17	·29	2	O	16○	·82	4	N	15●	·35	5	D	14	·88	**15**	7	Jr	13	·42		1	F	11	·95	3	Mr	13	·48
5	S	6	·66	7	O	6○	·19	1	N	4●	·72	3	D	4	·25	**16**	4	Jr	2	·78		6	F	1	·31	7	Mr	1	84
3	Au	26	·08	4	S	24○	·56	6	O	24	·09	7	N	22	62		2	D	22	·15	**17**	3	Jr	20	·68	5	F	19	·21
1	S	13	·92	3	O	13	·46	4	N	11	·99	6	D	11	·52	**18**	1	Jr	10	05		2	F	8○	·58	4	Mr	10	·10
6	S	3●	·29	7	O	2	·82	2	N	1	·35	3	N	30	·88		5	D	30	·41	**19**	6	Jr	28○	94	1	F	27	48
3	Au	23	·66	5	S	22	·19	6	O	21	·72	1	N	20	·25		2	D	19	·78	**20**	4	Jr	18●○	·31	5	F	16	·84
2	S	10	·56	4	O	10	·09	5	N	8	·62	7	D	8	·15	**21**	1	Jr	6	·68		3	F	5	·21	4	Mr	6	·74
6	Au	30	·92	1	S	29	·45	2	O	28	·98	4	N	27○	·52		6	D	27	·05	**22**	7	Jr	25	·58	2	F	24	·11
4	Au	20	·29	7 5	O S	18 18*	·35 ·82	**Mārgaśīrsha Kshayā.**				1	N	16○	·88		3	D	16	·41	**23**	4	Jr	14	·94	6 1	F Mr	13 15	·47 ·0C
3	S	8	·19	4	O	7	·72	6	N	6●○	·25	7	D	5	·78	**24**	2	Jr	4	·81		3	F	2	·84	5	Mr	3	37
7	Au	27	·56	2	S	26	·09	3	O	25●	·62	5	N	24	·15		6	D	28	·68	**25**	1	Jr	22	21	2	F	20	74
6	S	15○	·45	7	O	14	·98	2	N	13	·51	4	D	13	·04	**26**	5	Jr	11	-58		7	F	10	·11	1	Mr	11○	·64
3	S	4●○	·82	5	O	4	·35	6	N	2	·88	1	D	2	·41		2	D	31	94	**27**	4	Jr	30	·47	6	Mr	1○	·00
1	Au	25●○	·19	2	S	23	72	4	O	23	·25	5	N	21	·78		7	D	21	·31	**28**	1	Jr	19	·84	3	F	18	87
7	S	12	·08	1	O	11	·62	3	N	10	·15	4	D	9	·68	**29**	6	Jr	8○	·21		7	F	6●	74	2	Mr	8	·27
4	S	1	·45	5	S	30	·98	7	O	30	·51	2	N	29	·04		3	D	28○	·57	**30**	5	Jr	27●	·10	6	F	25	64
1	Au	21	·82	3	S	20	·35	4	O	19	·88	6	N	18	·41		7	D	17○	·94	**31**	2	Jr	16	·47	4	F	15	·00
7	S	9	·72	2	O	9	·25	3	N	7	·78	5	D	7	·31	**32**	6	Jr	5	·84		1	F	4	·37	2	Mr	4	·90
5	Au	29	·08	6	S	27	·61	1	O	27○	·14	2	N	25●	·68		4	D	25	·21	**33**	5	Jr	28	·74	7	F	22	·27
3	S	16	·98	5	O	16○	·51	7	N	15●	·04	1	D	14	·57	**34**	3	Jr	13	·10		4	F	11	·68	6	Mr	13	·16
1	S	6	·35	2	O	5○	·88	4	N	4	·41	5	D	3	·94	**35**	7	Jr	2	·47		2	F	1	·00	3	Mr	2	·53
5	Au	26	·72	7	S	25●	·25	1	O	24	·78	3	N	23	·31		4	D	22	·84	**36**	6	Jr	21	·37	7	F	19○	·90
4	S	13●	·61	6	O	13	·14	7	N	11	·67	2	D	11	·20	**37**	3	Jr	9	·74		5	F	8○	·27	6	Mr	9	·80
1	S	2●	·98	3	O	2	·51	5	N	1	·04	6	N	30	·57		1	D	30	·10	**38**	2	Jr	28●○	63	4	F	27	·16
6	Au	23	·35	7	S	21	·88	2	O	21	·41	3	N	19	·94		5	D	19	·47	**39**	7	Jr	18●	·00	1	F	16	·53
5	S	11	·24	6	O	10	·78	1	N	9	·31	2	D	8○	·84	**40**	4	Jr	7	·87		5	F	5	·90	7	Mr	6	·43.
2	Au	30	·61	4	S	29	·14	5	O	28	·67	7	N	27○	·20		1	D	26	·73	**41**	3	Jr	25	·26	4	F	23	·80
6 1	Au S	19 18	·98 ·51	3	O	18	·04	**Mārgaśīrsha Kshaya.**				4	N	16●○	·57		6	D	16	·10	**42**	7	Jr	14	·63	2 3	F Mr	18 14	·16 69
5	S	7	·88	7	O	7	·41	1	N	5●	·94	3	D	5	·47	**43**	5	Jr	4	·00		6	F	2	58	1	Mr	4	·06
3	Au	28	·24	4	S	26○	·77	6	O	26	·30	7	N	24	·84		2	D	24	·37	**44**	3	Jr	22	·90	5	F	21	·43
2	S	15○	·14	3	O	14	·67	5	N	13	·20	6	D	12	·73	**45**	1	Jr	11	·26		2	F	9	·79	4	Mr	11○	·32
6	S	4●○	·51	1	O	4	·04	2	N	2	·57	4	D	2	·10		5	D	31	·63	**46**	7	Jr	30	·16	1	F	28●	·69
3	Au	24●	·88	5	S	23	·41	6	O	22	·94	1	N	21	·47		3	D	21	·00	**47**	4	Jr	19○	·53	6	F	18●	·06
2	S	12	·77	4	O	12	·30	5	N	10	·83	7	D	10	·36	**48**	1	Jr	8○	·90		3	F	7●	·43	4	Mr	7	96
7	S	1	·14	1	S	30	·67	3	O	30	·20	4	N	28	·73		6	D	28○	·26	**49**	7	Jr	26	·79	2	F	25	·32
4	Au	21	·51	7	S	20	·04	7	O	19	·57	2	N	18	·10		3	D	17	·63	**50**	5	Jr	16	·16	6	F	14	·69
3	S	9	·40	4	O	8	·94	6	N	7○	·47	1	D	7●	·00	**51**	2	Jr	5	·53		4	F	4	·06	5	Mr	5	59
7	Au	29	·77	2	S	28	·30	3	O	27○	·83	5	N	26●	·36		6	D	25	·89	**52**	1	Jr	24	·42	2	F	22	·96
6	S	16	·67	1	O	16○	·20	2	N	14	·73	4	D	14	·26	**53**	5	Jr	12	·79		7	F	11	·82	1	Mr	12	·85
4	S	6	·04	5	O	5	·57	7	N	4	·10	1	D	3	·63	**54**	3	Jr	2	·16		4	Jr	31	·69	6	Mr	2○	·22
1	Au	26○	·40	2	S	24●	·93	4	O	24	·46	6	N	23	·00		7	D	22	·53	**55**	2	Jr	21	·06	3	F	19○	·59
7	S	14●	·30	1	O	13	·83	3	N	12	·36	4	D	11	·89	**56**	6	Jr	10	·42		7	F	8●○	·95	2	Mr	9	·48
4	S	2	·67	6	O	2	·20	7	O	31	·73	2	N	30	·26		3	D	29	·79	**57**	5	Jr	28●	·32	6	F	26	·85
2	Au	23	·04	3	S	21	·57	5	O	21	·10	6	N	19	·63		1	D	19○	·16	**58**	2	Jr	17	·69	4	F	16	·22
7	S	10	·93	2	O	10	·46	3	N	8	·99	5	D	8○	·52	**59**	7	Jr	7	·06		1	F	5	·59	3	Mr	7	·12
5	Au	31	·30	6	S	29	·83	1	O	29	·36	2	N	27○	·89		4	D	27	·42	**60**	5	Jr	25	·95	7	F	24	·84
2 4	Au S	19 18	·67 ·20	5	O	17	·73	7	N	16	·26	1	D	15	·79	**61**	3	Jr	14	·82		4	F	12	·85	6	Mr	14	·38
1	S	7	·56	3	O	7○	·10	4	N	5	·63	6	D	5	·16	**62**	7	Jr	3	·69		2	F	2	·22	3	Mr	3	·75

*For tithis by Brahma siddhānta add algebraically — ·02 to the above.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era.	Vaiśākha. Week-day.	Month.	Day.	Fraction.	Jyeṣṭha. Week-day.	Month.	Day.	Fraction.	Āshāḍha. Week-day.	Month.	Day.	Fraction.	Śrāvaṇa. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day.	Month.	Day.	Fraction.
							A.D.																				
3263	219	84	15M	·9016	17·3778	14·754	162	5	Ap	2○	·28	6	My	1●	·81	1	My	31	·84	2	Je	29	·87	4	Jl	29	·40
3264	220	85	16M	·1604	6·4861	10·911	163	2	Mr	22○	·65	4	Ap	21	·18	5	My	20	·71	7 / 1	Je / Jl	19 / 18	·24 / ·77	3	Au	17	·30
3265	221	86	15M	·4192	25·1250	9·044	164	1	Ap	9	·54	3	My	9	·07	4	Je	7	·60	6	Jl	7	·14	7	Au	5	·67
3266	222	87	15M	·6779	14·2883	5·201	165	5	Mr	29	·91	7	Ap	28	·44	1	My	27	·97	3	Je	26	·50	5	Jl	26○	·08
3267	223	88	15M	·9367	3·3416	1·859	166	3	Mr	19	·28	4 / 6	Ap / My	17 / 17	·81 / ·34	7	Je	15	·87	2	Jl	15○	·40	3	Au	13	·93
3268	224	89	16M	·1954	21·9805	27·047	167	2	Ap	7	·18	3	My	6	·71	5	Je	5	·24	6	Jl	4●○	·77	1	Au	3	·30
3269	225	90	15M	·4542	11·0888	23·204	168	6	Mr	26	·54	1	Ap	25	·07	2	My	24	·60	4	Je	23●	·13	5	Jl	22	·66
3270	226	91	15M	·7129	0·1971	19·861	169	3 / 5	Mr / Ap	15 / 14	·91 / ·44	6	My	13○	·97	1	Je	12	·50	3	Jl	12	·08	4	Au	10	·56
3271	227	92	15M	·9717	18·8359	17·494	170	2	Ap	3	·81	4	My	3●○	·34	5	Je	1	·87	7	Jl	1	·40	1	Jl	30	·93
3272	228	93	16M	·2305	7·9442	13·052	171	7	Mr	24	·17	1	Ap	22●○	·70	3	My	22	·24	4	Je	20	·77	6 / 7	Jl / Au	20 / 18	·30 / ·83
3273	229	94	15M	·4892	26·5831	11·785	172	6	Ap	11	·07	7	My	10	·60	2	Je	9	·13	3	Jl	8	·66	5	Au	7	·19
3274	230	95	15M	·7480	15·6914	7·942	173	3	Mr	31	·44	4	Ap	29	·97	6	My	29	·50	1	Je	28	·03	2	Jl	27	·56
3275	231	96	16M	·0067	4·7997	4·099	174	7	Mr	20	·81	2	Ap	19	·34	3 / 5	My / Je	18 / 17	·87 / ·40	6	Jl	16	·93	1	Au	15○	·46
3276	232	97	16M	·2655	23·4386	2·233	175	6	Ap	8	·70	1	My	8	·23	2	Je	6	·76	4	Jl	6	·30	5	Au	4●	·83
3277	233	98	15M	·5242	12·5469	25·945	176	4	Mr	28	·07	5	Ap	26	·60	7	My	26	·13	1	Je	24○	·66	3	Jl	24●	·19
3278	234	99	15M	·7830	1·6552	22·102	177	1	Mr	17	·44	2 / 4	Ap / My	15 / 15	·97 / ·50	6	Je	14○	·03	7	Jl	13●	·56	2	Au	12	·09
3279	235	100	16M	·0417	20·2941	20·235	178	7	Ap	5	·34	1	My	4	·87	3	Je	3○	·40	4	Jl	2	·93	6	Au	1	·46
3280	236	101	16M	·3005	9·4024	16·392	179	4	Mr	25	·70	6	Ap	24	·23	7	My	23●	·76	2	Je	22	·29	3	Jl	21	·82
3281	237	102	15M	·5593	28·0418	14·526	180	3	Ap	12○	·60	5	My	12●	·13	6	Je	10	·66	1	Jl	10	·19	2	Au	8	·72
3282	238	103	15M	·8180	17·1496	10·683	181	7	Ap	1○	·97	2	My	1	·50	4	My	31	·03	5	Je	29	·56	7	Jl	29	·09
3283	239	104	16M	·0768	6·2579	6·840	182	5	Mr	22	·33	6	Ap	20	·86	1	My	20	40	2 / 4	Je / Jl	18 / 18	·93 / ·46	5	Au	16	·99
3284	240	105	16M	·3355	24·8968	4·973	183	4	Ap	10	·23	5	My	9	·76	7	Je	8	·29	1	Jl	7	·82	3	Au	6○	·35
3285	241	106	15M	·5943	14·0051	1·130	184	1	Mr	29	·60	3	Ap	28	·13	4	My	27	·66	6	Je	26	·19	7	Jl	25○	·72
3286	242	107	15M	·8530	3·1134	24·842	185	5	Mr	18	·97	7 / 2	Ap / My	17 / 17	·50 / ·03	3	Je	15	·56	5	Jl	15●○	·09	6	Au	13	·62
3287	243	108	16M	·1118	21·7522	22·976	186	4	Ap	6	·86	6	My	6	·39	7	Je	4	·92	2	Jl	4●	·46	3	Au	2	·99
3288	244	109	16M	·3706	10·8605	19·133	187	2	Mr	27	·23	3	Ap	25	·76	5	My	25○	·29	6	Je	23	·82	1	Jl	23	·35
3289	245	110	15M	·6293	29·4994	17·266	188	6 / 1	Mr / Ap	15 / 14	·60 / ·13	2	My	13●○	·66	4	Je	12	·19	5	Jl	11	·72	7	Au	10	·25
3290	246	111	15M	·8881	18·6077	13·423	189	5	Ap	3	·50	7	My	3●○	·03	1	Je	1	·56	3	Jl	1	·09	4	Jl	30	·62
3291	247	112	16M	·1468	7·7160	9·581	190	2	Mr	23○	·86	4	Ap	22●	·39	5	My	21	·92	7	Je	20	·45	1 / 3	Jl / Au	19 / 18	·98 / ·52
3292	248	113	16M	·4056	26·3549	7·714	191	1	Ap	11	·76	3	My	11	·29	4	Je	9	·82	6	Jl	9	·35	7	Au	7	·88
3293	249	114	15M	·6643	15·4632	3·871	192	6	Mr	31	·13	7	Ap	29	·66	2	My	29	·19	3	Je	27	·72	5	Jl	27	·25
3294	250	115	15M	·9231	4·5715	0·028	193	3	Mr	20	·49	5	Ap	19	·02	6 / 1	My / Je	18 / 17	·56 / ·09	2	Jl	16	·62	4	Au	15	·15
3295	251	116	16M	·1819	23·2104	25·716	194	2	Ap	8	·39	3	My	7	92	5	Je	6	·45	6	Jl	5○	·98	1	Au	4●	·51
3296	252	117	16M	·4406	12·3187	21·873	195	6	Mr	28	·76	1	Ap	27	·29	2	My	26	·82	4	Je	25○	·35	5	Jl	24●	·88
3297	253	118	15M	·6994	1·4270	18·031	196	4	Mr	17	·18	5 / 7	Ap / My	15 / 15	·66 / ·19	1	Je	13○	·72	3	Jl	13	·25	4	Au	11	·78
3298	254	119	15M	·9581	20·0659	16·164	197	3	Ap	5	·02	7	My	4	·55	6	Je	3	·08	7	Jl	2	,62	2	Au	1	·15
3299	255	120	16M	·2169	9·1742	12·321	198	7	Mr	23	·39	1	Ap	23○	·92	3	My	23●	·45	4	Je	21	·91	6	Jl	21	·51
3300	256	121	16M	·4756	27·8131	10·454	199	6	Ap	13○	·29	7	My	12	·82	2	Je	11	·35	3	Jl	10	·88	5	Au	9	·41
3301	257	122	15M	·7344	16·9214	6·612	200	3	Ap	1●	·66	5	My	1	·19	6	My	30	·72	1	Je	29	·25	2	Jl	28	·78
3302	258	123	15M	·9932	6·0297	2·769	201	1	Mr	22●	·02	2	Ap	20	·55	4	My	20	·08	5 / 7	Je / Jl	18 / 18	·14 / ·61	1	Au	16○	·6
3303	259	124	16M	2519	24·6686	0·902	202	6	Ap	9	·92	1	My	9	45	2	Je	7	·98	4	Jl	7	·51	6	Au	6○	·04
3304	260	125	16M	·5107	13·7769	24·614	203	4	Mr	30	·29	5	Ap	28	·82	7	My	28	·35	1	Je	26	88	3	Jl	26●○	·41
3305	261	126	15M	·7694	2·8852	20·771	204	1	Mr	18	·65	3 / 4	Ap / My	17 / 16	·18 / ·72	6	Je	15	·25	7	Jl	14●	·78	2	Au	13	·3
3306	262	127	16M	·0282	21·5240	18·904	205	7	Ap	6	·55	2	My	6	·08	3	Je	4○	·61	5	Jl	4	·14	6	Au	2	·6
3307	263	128	16M	·2869	10·6323	15·062	206	4	Mr	26	·92	6	Ap	25	·45	7	My	24●○	·98	2	Je	23	·51	4	Jl	23	·0
3308	264	129	16M	·5457	29·2712	13·195	207	3	Ap	14	·82	5	My	14●○	·35	6	Je	12	·88	1	Jl	12	·41	2	Au	10	·9
3309	265	130	15M	·8044	18·3795	9·352	208	1	Ap	3○	·18	2	My	2●	·71	4	Je	1	·24	5	Je	30	·78	7	Jl	30	·3
3310	266	131	16M	·0632	7·4878	5·509	209	5	Mr	23○	·55	7	Ap	22	·08	1	My	21	·61	3 / 4	Je / Jl	20 / 19	·14 / ·67	6	Au	18	·2
3311	267	132	16M	·3220	26·1267	3·643	210	4	Ap	11	·45	5	My	10	·98	7	Je	9	·51	2	Jl	9	·04	3	Au	7	·5
3312	268	133	16M	·5807	15·2350	27·355	211	1	Mr	31	·82	3	Ap	30	·35	4	My	29	·88	6	Je	28	·41	7	Jl	27	·9
3313	269	134	15M	·8395	4·3433	23·512	212	6	Mr	20	·18	7	Ap	18	·71	2 / 3	My / Je	18 / 16	·24 / ·77	5	Jl	16○	·30	6	Au	14●	·8
3314	270	135	16M	·0982	22·9822	21·645	213	5	Ap	8	·08	6	My	7	·61	1	Je	6	·14	2	Jl	5○	·67	4	Au	4●	·2
3315	271	136	16M	·3570	12·0905	17·802	214	2	Mr	28	·45	3	Ap	26	·98	5	My	26	·51	7	Je	25○	·04	1	Jl	24	·
3316	272	137	16M	·6157	1·1988	13·960	215	6	Mr	17	·81	1 / 2	Ap / My	16 / 15	·34 / ·88	4	Je	14●	·41	5	Jl	13	·94	7	Au	12	·

* Ending moment of tithis are the same for Ārya and Sūrya siddhāntas

from 1 B.C. to 500 A.D. (Sūrya siddhānta)*—cont.

Āśvina. Week-day.	Month.	Day.	Fraction.	Kārttika. Week-day.	Month.	Day.	Fraction.	Mārgaśīrsha. Week-day.	Month.	Day.	Fraction.	Pausha. Week-day.	Month.	Day.	Fraction.	A.D.	Māgha. Week-day.	Month.	Day.	Fraction.	A.D.	Phālguna. Week-day.	Month.	Day.	Fraction.	Chaitra. Week-day.	Month.	Day.	Fraction.
5	Au	27	·93	7	S	26○	·46	1	O	25	·99	3	N	24	·52		5	D	24	·05	**63**	6	Jr	22	·58	1	F	21	·12
4	S	15●○	·83	6	O	15	·36	7	N	13	·89	2	D	13	·42	**64**	3	Jr	11	·95		5	F	10	·48	7	Mr	11	·01
2	S	4●	·20	3	O	3	·73	5	N	2	·26	6	D	1	·79		1	D	31	·32	**65**	2	Jr	29○	85	4	F	28●	·38
6	Au	24	·56	1	S	28	09	2	O	22	·62	4	N	21	·15		5	D	20	·69	**66**	4	Jr	19○	·22	1	F	17●	75
5	S	12	·46	6	O	11	·99	1	N	10	·52	3	D	10	·05	**67**	4	Jr	8○	·58		6	F	7	·11	7	Mr	8	64
2	S	1	·83	4	O	1	·36	5	O	30	·89	7	N	29	·42		1	D	28	·95	**68**	3	Jr	27	·48	5	F	26	·01
7	Au	21	·20	1	S	19	·73	3	O	19	26	4	N	17○	·79		6	D	17●	·32	**69**	7	Jr	15	·85	2	F	14	·38
6	S	9	·09	7	O	8	·62	2	N	7○	·15	3	D	6●	·68	**70**	5	Jr	5	·22		6	F	3	·75	1	Mr	5	28
3	Au	29	·46	4	S	27	·99	6	O	27○	·52	1	N	26	·05		2	D	25	·58	**71**	4	Jr	24	·11	5	F	22	·64
2	S	17	36	3	O	16	·89	5	N	15	·42	6	D	14	·95	**72**	1	Jr	13	·48		3	F	12	01	4	Mr	12○	54
6	S	5○	·72	1	O	5●	·26	2	N	3	79	4	D	3	·32	**73**	5	Jr	1	·85		7	Jr	31	·38	1	Mr	1○	91
4	Au	26○	·09	5	S	24	62	7	O	24	·15	1	N	22	·68		3	D	22	·21	**74**	4	Jr	20	·74	6	F	19●○	·28
2	S	13	·99	4	O	13	·52	6	N	12	·05	7	D	11	58	**75**	2	Jr	10	·11		3	F	8●	·64	5	Mr	10	·17
7	S	3	·86	1	O	2	·89	5	N	1	·42	4	N	30	·95		6	D	30○	·48	**76**	1	Jr	29	·01	2	F	27	·54
4	Au	22	·72	6	S	21	·25	7	O	20	·78	2	N	19	·32		3	D	18○	·85	**77**	5	Jr	17	·38	6	F	15	91
3	S	10	·62	5	O	10	·15	6	N	8	·68	1	D	8●○	·21	**78**	2	Jr	6	·74		4	F	5	27	5	Mr	6	80
7	Au	30	99	2	S	29	·52	4	O	29	·05	5	N	27●	·58		7	D	27	·11	**79**	1	Jr	25	·64	3	F	24	·17
{5	Au	20	·36	1	O	18○	·42	2	N	16	·95	4	D	16	·48	**80**	6	Jr	15	·01		7	F	13	54	2	Mr	14	07
{6	S	18	89																										
4	S	7	·25	5	O	6○	78	7	N	5	·31	1	D	4	·84	**81**	3	Jr	3	·38		4	F	1	·91	6	Mr	3	·44
1	Au	27	·62	3	S	26●○	15	4	O	25	·68	6	N	24	·21		7	D	23	·74	**82**	2	Jr	22	·27	3	F	20	·80
7	S	15	·52	2	O	15	·05	3	N	13	·58	5	D	13	·11	**83**	6	Jr	11	·64		1	F	10○	·17	2	Mr	11●	·70
4	S	4	·88	6	O	4	·42	7	N	2	·95	2	D	2	·48	**84**	4	Jr	1	·01		5	Jr	30○	·54	7	F	29●	07
2	Au	24	·25	3	S	22	·78	5	O	22	·31	6	N	20	·84		1	D	20	·37	**85**	2	Jr	18○	·90	4	F	17	·44
1	S	12	·15	2	O	11	·68	4	N	10	·21	5	D	9	·74	**86**	7	Jr	8●	·27		1	F	6	·80	3	Mr	8	·33
5	S	1	52	7	O	1	05	1	O	30	·58	3	N	29○	·11		4	D	28●	·64	**87**	6	Jr	27	·17	7	F	25	70
2	Au	21	·88	4	S	20	·41	5	O	19	·94	7	N	18○	·48		2	D	18●	·01	**88**	3	Jr	16	·54	5	F	15	·07
1	S	8	78	3	O	8	·31	4	N	6○	·84	6	D	6	·37	**89**	7	Jr	4	·90		2	F	3	·48	3	Mr	4	·96
6	Au	29	·15	7	S	27	·68	2	O	27●	·21	3	N	25	·74		5	D	25	·27	**90**	6	Jr	23	·80	1	F	22	·38
5	S	17	·05	6	O	16	·58	1	N	15	·11	2	D	14	·64	**91**	4	Jr	13	·17		5	F	11	70	7	Mr	13○	·28
2	S	6○	41	3	O	5●	94	5	N	4	·47	7	D	4	·00	**92**	1	Jr	2	·54		3	F	1	·07	4	Mr	1●○	·60
6	Au	25○	·78	1	S	24	·31	2	O	23	·84	4	N	22	·37		5	D	21	·90	**93**	7	Jr	20	43	1	F	18●	·96
5	S	13	·68	7	O	13	·21	1	N	11	·74	3	D	11	·27	**94**	4	Jr	9○	·80		6	F	8	·33	7	Mr	9	·86
3	S	3	·04	4	O	2	·58	6	N	1	·11	7	N	30	·64		2	D	30○	·17	**95**	3	Jr	28	·70	5	F	27	·23
7	Au	23	·41	1	S	21	·94	3	O	21	·47	5	N	20	·00		6	D	19●○	·53	**96**	1	Jr	18	·06	2	F	16	60
6	S	10	·31	7	O	9	·84	2	N	8	·37	3	D	7●	90	**97**	5	Jr	6	·43		6	F	4	·96	1	Mr	6	·49
3	Au	30	·68	5	S	29	·21	6	O	28○	74	1	N	27○	27		2	D	26	80	**98**	4	Jr	25	·33	5	F	23	·86
{1	Au	20	·04	5	O	18○	·10	5	N	16	·64	7	D	16	17	**99**	1	Jr	34	·70		3	F	13	·23	4	Mr	14	76
{2	S	18	·57																										
6	S	7	·94	1	O	7●○	47	3	N	6	00	4	D	5	53	**200**	6	Jr	4	06		7	F	2	·59	2	Mr	3	12
4	Au	27	·31	5	S	25	·84	7	O	25	·37	1	N	23	90		3	D	23	·43	**01**	4	Jr	21	·96	6	F	20○	·49
3	S	15	·21	4	O	14	·74	6	N	13	27	7	D	12	·80	**02**	2	Jr	11	·33		3	F	9○	·86	5	Mr	11●	39
7	S	4	·57	2	O	4	·10	3	N	2	·63	5	D	2	16		6	D	31	70	**03**	1	Jr	30○	·23	2	F	28	76
4	Au	24	·94	6	S	23	·47	1	O	23	·00	2	N	21	53		4	D	21	·06	**04**	5	Jr	19	·59	7	F	18	·12
3	S	11	·84	5	O	11	·37	6	N	9	·90	1	D	9○	·43	**05**	2	Jr	7	·96		4	F	6	·49	6	Mr	8	02
1	S	1	·20	2	S	30	·74	4	O	30	27	5	N	28○	·80		7	D	28●	·33	**06**	1	Jr	26	86	3	F	25	·39
5	Au	21	·57	7	S	20	·10	1	O	19	·63	3	N	18○	16		4	D	17	69	**07**	6	Jr	16	·22	{7	F	14	76
																										{2	Mr	16	29
4	S	9	·47	6	O	9	·00	7	N	7	53	2	D	7	·06	**08**	3	Jr	5	·59		5	F	4	·12	6	Mr	4	·65
1	Au	28	·84	3	S	27	·37	4	O	26●	·90	6	N	25	·43		7	D	24	·96	**09**	2	Jr	23	·49	4	F	22	·02
7	S	16○	·73	2	O	16●	·26	3	N	14	80	5	D	14	·33	**10**	6	Jr	12	·86		1	F	11	39	2	Mr	12●○	92
5	S	6○	·10	6	O	5	·63	1	N	4	·16	2	D	3	69	**11**	4	Jr	2	·22		5	Jr	31	·75	7	Mr	2●	·28
2	Au	26●	·47	4	S	25	·00	5	O	24	·53	7	N	23	06		1	D	22	·59	**12**	3	Jr	25○	·12	4	F	19	·65
1	S	13	·37	2	O	12	·90	4	N	11	·43	5	D	10	96	**13**	7	Jr	9○	49		2	F	8	·02	3	Mr	9	·55
5	S	2	·73	7	O	2	·26	1	O	31	·79	3	N	30	82		4	D	29○	·86	**14**	6	Jr	28	·39	7	F	26	·92
3	Au	28	·10	4	S	21	·63	6	O	21	·16	7	N	19	·69		2	D	19	·22	**15**	3	Jr	17	·75	5	F	16	·28
2	S	11	·00	3	O	10	·53	5	N	9	·06	6	D	8	59	**16**	1	Jr	7	·12		2	F	5	·65	4	Mr	6	·18

*For tithis by Brahma siddhānta add algebraically — ·02 to the above.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year: Month and day A.D.	Commencement of solar year: Fraction of day.	First new moon in solar year.	Anomaly of first new moon	Christian era A.D.	Vaiśākha: Week-day.	Month.	Day.	Fraction.	Jyeshtha: Week-day.	Month.	Day.	Fraction.	Āshādha: Week-day.	Month.	Day.	Fraction.	Śrāvana: Week-day.	Month.	Day.	Fraction.	Bhādrapada: Week-day.	Month.	Day.	Fraction.
3317	273	138	15M	·8745	19·8377	12·093	216	5	Ap	4	·71	7	My	4○	·24	1	Je	2●	·77	3	Jl	2	·80	4	Jl	31	88
3318	274	139	16M	·1333	8·9460	8·250	217	3	Mr	25	·08	4	Ap	23○	61	6	My	23	14	7	Je	21	67	2	Jl	21	·20
3319	275	140	16M	·3920	27·5849	6·383	218	1	Ap	12●	·98	3	My	12	·51	5	Je	11	·04	6	Jl	10	·57	1	Au	9	10
3320	276	141	16M	6508	16·6932	2·541	219	6	Ap	2●	·34	7	My	1	·87	2	My	31	·40	3	Je	29	·94	5	Jl	29	·47
3321	277	142	15M	·9095	5·8015	26·252	220	3	Mr	21●	·71	5	Ap	20	·24	6	My	19	77	1 2	Je Jl	18 17	·30 83	4	Au	16○	36
3322	278	143	16M	·1683	24·4404	24·386	221	2	Ap	9	·61	4	My	9	·14	5	Je	7	·67	7	Jl	7	20	1	Au	5●○	·73
3323	279	144	16M	·4270	13·5486	20·543	222	6	Mr	29	·98	1	Ap	28	·51	3	My	28	·04	4	Je	26	57	6	Jl	26●	·10
3324	280	145	16M	·6858	2·6569	16·700	223	4	Mr	19	34	5 7	Ap My	17 17	·87 ·40	1	Je	15○	93	3	Jl	15	·46	5	Au	14	·00
3325	281	146	15M	·9445	21·2958	14·833	224	3	Ap	6	·24	4	My	5	·77	6	Je	4●○	·30	7	Jl	3	·83	2	Au	2	·36
3326	282	147	16M	·2033	10·4041	10·991	225	7	Mr	26	·61	2	Ap	25	·14	3	My	24●○	·67	5	Je	23	·20	6	Jl	22	·78
3327	283	148	16M	·4621	29·0430	9·124	226	6	Ap	14	·50	1	My	14	04	2	Je	12	·57	4	Jl	12	10	5	Au	10	63
3328	284	149	16M	7208	18·1518	5·281	227	3	Ap	3○	·87	5	My	3	40	6	Je	1	·93	1	Jl	1	·46	2	Jl	30	·99
3329	285	150	15M	·9796	7·2596	1·438	228	1	Mr	23●○	24	2	Ap	21	·77	4	My	21	·80	5 7	Je Jl	19 19	83 ·36	1	Au	17	·89
3330	286	151	16M	2383	25·8985	27·126	229	7	Ap	11	·14	1	My	10	·67	3	Je	9	·20	4	Jl	8	·73	6	Au	7	26
3331	287	152	16M	·4971	15·0068	23·284	230	4	Mr	31	50	6	Ap	30	·08	7	My	29	56	2	Je	28	10	3	Jl	27○	·68
3332	288	153	16M	·7558	4·1151	19·441	231	1	Mr	20	·87	3	Ap	19	40	4 6	My Je	18 17	·93 ·46	7	Jl	16○	·99	2	Au	15●	52
3333	289	154	16M	·0146	22·7540	17·574	232	7	Ap	7	77	2	My	7	·30	3	Je	5	·83	5	Jl	5○	·36	6	Au	3	89
3334	290	155	16M	·2734	11·8623	13·731	233	5	Mr	28	·14	6	Ap	26	·67	1	My	26	·20	2	Je	24●	73	4	Jl	24	·26
3335	291	156	16M	·5321	0·9706	9·889	234	2 4	Mr Ap	17 16	·50 ·03	5	My	15○	56	7	Je	14●	·09	1	Jl	13	·62	3	Au	12	·16
3336	292	157	16M	·7909	19·6095	8·022	235	1	Ap	5	·40	2	My	4○	93	4	Je	3●	·46	5	Jl	2	99	7	Au	1	·52
3337	293	158	16M	·0496	8·7178	4·179	236	5	Mr	24	·77	7	Ap	23●○	·30	1	My	22	·83	3	Je	21	86	4 6	Jl Au	20 19	·89 ·42
3338	294	159	16M	·3084	27·3567	2·312	237	4	Ap	12●	66	6	My	12	20	7	Je	10	73	2	Jl	10	26	3	Au	8	·79
3339	295	160	16M	·5671	16·4650	26·024	238	2	Ap	2●	08	3	My	1	·56	5	My	31	·09	6	Je	29	·62	1	Jl	29	15
3340	296	161	16M	·8259	5·5733	22·181	239	6	Mr	22	·40	7	Ap	20	93	2	My	20	·46	3 5	Je Jl	18 18	99 ·52	7	Au	17●○	05
3341	297	162	16M	0847	24·2121	20·315	240	5	Ap	9	·30	6	My	8	·83	1	Je	7	36	2	Jl	6	89	4	Au	5●	·42
3342	298	163	16M	·3434	13·3204	16·472	241	2	Mr	29	·66	4	Ap	28	·19	5	My	27	·72	7	Je	26○	·26	1	Jl	25	·79
3343	299	164	16M	·6022	2·4287	12·629	242	7	Mr	19	·08	1 3	Ap My	17 17	56 09	4	Je	15●○	62	6	Jl	15	·15	7	Au	13	·68
3344	300	165	16M	·8609	21·0676	10·762	243	5	Ap	7	·93	7	My	6	·46	1	Je	4●○	99	3	Jl	4	52	5	Au	3	·05
3345	301	166	16M	·1197	10·1759	6·920	244	3	Mr	26	30	4	Ap	24	·88	6	My	24●	36	7	Je	22	89	2	Jl	22	·42
3346	302	167	16M	·3784	28·8148	5·053	245	2	Ap	14○	·19	3	My	13	·72	5	Je	12	25	6	Jl	11	78	1	Au	10	·32
3347	303	168	16M	·6372	17·9231	1·210	246	6	Ap	3●○	·56	1	My	3	·09	2	Je	1	·62	4	Jl	1	·15	5	Jl	30	·68
3348	304	169	16M	·8959	7·0314	24·922	247	3	Mr	23●	·93	5	Ap	22	46	6	My	21	·99	1 3	Je Jl	20 20	·52 05	4	Au	18	·58
3349	305	170	16M	·1547	25·6703	23·055	248	2	Ap	10	82	4	My	10	·36	5	Je	8	·89	7	Jl	8	·42	1	Au	6	·95
3350	306	171	16M	·4135	14·7786	10·213	249	7	Mr	31	·19	1	Ap	29	·72	3	My	29	·25	4	Je	27	·78	6	Jl	27○	·31
3351	307	172	16M	·6722	3·8869	15·370	250	4	Mr	20	·56	6	Ap	19	·09	7 2	My Je	18 17	·62 ·15	3	Jl	16○	·68	5	Au	15	·21
3352	308	173	16M	·9310	22·5258	13·503	251	3	Ap	8	·46	4	My	7	·99	6	Je	6	·52	1	Jl	6●	·05	2	Au	4	·58
3353	309	174	16M	1897	11·6341	9·660	252	7	Mr	27	82	2	Ap	26	·85	3	My	25○	·88	5	Je	24●	·41	6	Jl	23	·95
3354	310	175	16M	·4485	0·7424	5·818	253	5 6	Mr Ap	17 15	·19 ·72	1	My	15○	·25	2	Je	13●	·78	4	Jl	13	·31	5	Au	11	·84
3355	311	176	16M	·7072	19·3813	3·951	254	4	Ap	5	·09	5	My	4●○	·62	7	Je	3	·15	1	Jl	2	·68	3	Au	1	21
3356	312	177	16M	·9660	8·4896	0·108	255	1	Mr	25	·45	2	Ap	23●	·99	4	My	23	52	6	Je	22	·05	7 2	Jl Au	21 20	58 ·11
3357	313	178	16M	·2248	27·1285	25·796	256	7	Ap	12●	85	1	My	11	·88	3	Je	10	·41	4	Jl	9	·94	6	Au	8	·47
3358	314	179	16M	·4835	16·2368	21·953	257	4	Ap	1	·72	6	My	1	·25	7	My	30	78	2	Je	29	·31	3	Jl	28	·84
3359	315	180	16M	·7423	5·3451	18·110	258	2	Mr	22	·09	3	Ap	20	62	5	My	20	·15	6 1	Je Jl	18 18	·68 ·21	2	Au	16●	·74
3360	316	181	17M	·0010	28·9889	16·244	259	7	Ap	9	·98	2	My	9	·51	4	Je	8	·05	5	Jl	7○	·58	7	Au	6●	·11
3361	317	182	16M	·2598	18·0922	12·401	260	5	Mr	29	·35	6	Ap	27	·88	1	My	27	41	2	Je	25○	·94	4	Jl	25	·47
3362	318	183	16M	·5185	2·2005	8·558	261	2	Mr	18	72	4 5	Ap My	17 16	·25 ·78	7	Je	15●○	31	1	Jl	14	84	3	Au	13	·87
3363	319	184	16M	·7773	20·8394	6·691	262	1	Ap	6	·62	3	My	6	·15	4	Je	4●	68	6	Jl	4	21	7	Au	2	·74
3364	320	185	17M	0361	9·9477	2·849	263	5	Mr	26	·98	7	Ap	25○	·51	2	My	25	·04	3	Je	23	57	5	Jl	23	·11
3365	321	186	16M	·2948	28·5866	0·982	264	4	Ap	13●○	·88	6	My	13	·41	7	Je	11	94	2	Jl	11	·47	4	Au	10	·00
3366	322	187	16M	·5536	17·6949	24·694	265	2	Ap	3●○	25	3	My	2	·78	5	Je	1	·31	6	Je	30	·84	1	Jl	30	·37
3367	323	188	16M	·8123	6·8032	20·851	266	6	Mr	23●	·61	1	Ap	22	·15	2	My	21	·68	4 5	Je Jl	20 19	·21 ·74	7	Au	18	·27
3368	324	189	17M	·0711	25·4421	18·984	267	5	Ap	11	51	7	My	11	·04	1	Je	9	57	3	Jl	9	·10	4	Au	7○	·63
3369	325	190	16M	·3298	14·5504	15·141	268	2	Mr	30	·88	4	Ap	29	·41	5	My	28	·94	7	Je	27	·47	2	Jl	27○	·00

* Ending moments of tithis by Ārya siddhānta are the same as those given above.

from 1 B.C. to A.D. 500 (Sūrya siddhānta)*—*cont.*

Āśvina.				Kārttika.				Mārgaśirsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day	Month.	Day.	Fraction.	Week-day	Month	Day.	Fraction.	Week-day	Month	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month	Day.	Fraction.	Week-day.	Month.	Day	Fraction.
6	Au	30	·36	7	S	28	90	2	O	28○	·43	3	N	26	·96		5	D	26	49	**17**	7	Jr	25	02	1	F	23	55
{ 8	Au	19	·73	6	O	17●○	79	1	N	16	·82	2	D	15	85	**18**	4	Jr	14	38		5	F	12	·92	7	Mr	14	45
{ 5	S	18	·26																										
2	S	7	·63	4	O	7●○	·16	5	N	5	·69	7	D	5	22	**19**	1	Jr	8	75		3	F	2	28	4	Mr	3○	81
7	Au	28○	·00	1	S	26	·53	3	O	26	06	4	N	24	59		6	D	24	12	**20**	7	Jr	22	65	2	F	21○	18
5	S	14	·89	7	O	14	·42	1	N	12	96	3	D	12	49	**21**	5	Jr	11	·02		6	F	9○	55	1	Mr	11	08
3	S	4	·26	4	O	3	79	6	N	2	82	7	D	1	·85		2	D	31	38	**22**	3	Jr	29●	91	5	F	28	·44
7	Au	24	·63	2	S	23	16	3	O	22	69	5	N	21	22		6	D	20○	75	**23**	1	Jr	19●	28	2	F	17	81
6	S	12	·53	1	O	12	·06	2	N	10	59	4	D	10○	12	**24**	5	Jr	8●	65		7	F	7	·18	1	Mr	7	71
3	Au	31	·89	5	S	30	·42	6	O	29	95	1	N	28○	·48		3	D	28	·02	**25**	4	Jr	26	·55	6	F	25	08
1	Au	21	·26	2	S	19	·79	4	O	19	82	5	N	17●	85		7	D	17	·88	**26**	1	Jr	15	·91	{ 3	F	14	·44
																										{ 4	Mr	15	·97
7	S	9	·16	1	O	8	·69	3	N	7●	·22	4	D	6	75	**27**	6	Jr	5	28		7	F	8	81	2	Mr	5	34
4	Au	29	52	6	S	28○	06	7	O	27	·59	2	N	26	·12		3	D	25	65	**28**	5	Jr	24	18	6	F	22	·71
3	S	16○	·42	4	O	15	.95	6	N	14	·48	1	D	14	·01	**29**	2	Jr	12	54		4	F	11	08	5	Mr	12●	61
7	S	5	79	2	O	5	.32	3	N	3	·85	5	D	3	·38	**30**	6	Jr	1	·91		1	Jr	31○	44	2	Mr	1	97
5	Au	26●	·16	6	S	24	·69	1	O	24	22	2	N	22	·75		4	D	22	28	**31**	5	Jr	20○	·81	7	F	19	84
4	S	14	·05	5	O	13	58	7	N	12	12	1	D	11	·65	**32**	3	Jr	10●○	18		4	F	8	71	6	Mr	9	24
1	S	2	·42	2	O	1	·95	4	O	31	·48	6	N	30	01		7	D	29●	·54	**33**	2	Jr	28	07	3	F	26	60
5	Au	22	·79	7	S	21	·32	1	O	20	·85	3	N	19	·38		4	D	18	91	**34**	6	Jr	17	·44	7	F	15	·97
4	S	10	·69	6	O	10	·22	7	N	8○	75	2	D	8	28	**35**	3	Jr	6	·81		5	F	5	34	6	Mr	6	87
2	Au	31	·05	3	S	29	58	5	O	29●○	11	6	N	27	·64	*	1	D	27	18	**36**	2	Jr	25	71	4	F	24	24
7	S	17	·95	2	O	17●○	48	4	N	16	·01	5	D	15	54	**37**	7	Jr	14	07		1	F	12	60	3	Mr	14	13
5	S	7○	·82	6	O	6	·85	1	N	5	·38	2	D	4	91	**38**	4	Jr	8	·44		5	F	1	·97	7	Mr	8○	·50
2	Au	27○	·68	4	S	26	·22	5	O	25	·75	7	N	24	·28		1	D	23	81	**39**	3	Jr	22	84	4	F	20○	·87
1	S	15	·58	3	O	15	11	4	N	13	64	6	D	13	·17	**40**	7	Jr	11	·70		2	F	10○	·24	3	Mr	10	·77
5	S	3	95	7	O	3	·48	2	N	2	·01	3	D	1	·54		5	D	31○	07	**41**	6	Jr	29●	·60	1	F	28	·13
3	Au	24	·32	4	S	22	·85	6	O	22	·38	7	N	20	·91		2	D	20○	44	**42**	3	Jr	18	·97	5	F	17	·50
2	S	12	·21	3	O	11	·74	5	N	10	·28	6	D	9○	·81	**43**	1	Jr	8	34		2	F	6	·87	4	Mr	8	·40
6	S	1	·58	1	O	1	·11	2	O	30	·64	4	N	29	·17		5	D	28	70	**44**	7	Jr	27	23	1	F	25	·76
3	Au	20	·95	5	S	19	·48	7	O	19	·01	1	N	17	54		3	D	17	·07	**45**	4	Jr	15	·60	{ 6	F	14	·13
																										{ 7	Mr	15	·66
2	S	8	·85	4	O	8○	·88	5	N	6●	·91	7	D	6	·44	**46**	1	Jr	4	·97		3	F	3	·50	5	Mr	5	·03
7	Au	29	·21	1	S	27○	·74	3	O	27	·27	4	N	25	·80		6	D	25	·34	**47**	7	Jr	23	·87	2	F	22	·40
6	S	17	·11	7	O	16	·64	2	N	15	·17	3	D	14	·70	**48**	5	Jr	13	·28		6	F	11○	·76	1	Mr	12	·29
3	S	5●	·48	5	O	5	·01	6	N	3	·54	1	D	3	·07	**49**	2	Jr	1	·60		4	Jr	31○	·18	5	Mr	1	·66
7	Au	25●	84	2	S	24	·88	3	O	23	91	5	N	22	44		6	D	21	·97	**50**	1	Jr	20●○	·50	3	F	19	·03
6	S	13	·74	1	O	13	·27	2	N	11	·80	4	D	11	·33	**51**	5	Jr	9●	86		7	F	8	·40	1	Mr	9	·93
4	S	3	·11	5	O	2	·64	7	N	1	·17	1	N	30	·70		3	D	30	·23	**52**	4	Jr	28	·76	6	F	27	29
1	Au	22	·48	3	S	21	·01	4	O	20	·54	6	N	19○	·07		7	D	18	·60	**53**	2	Jr	17	·13	3	F	15	·66
7	S	10	·37	1	O	9	·90	3	N	8○	·43	4	D	7	·97	**54**	6	Jr	6	·50		1	F	5	·03	2	Mr	6	·56
4	Au	30	·74	6	S	29	·27	7	O	28●○	80	2	N	27	·33		3	D	26	·86	**55**	5	Jr	25	·89	6	F	23	92
3	S	18○	64	5	O	18	·17	6	N	16	·70	1	D	16	·23	**56**	2	Jr	14	76		4	F	13	·29	5	Mr	13○	·82
1	S	7○	·01	2	O	6	·54	4	N	5	07	5	D	4	·60	**57**	7	Jr	3	·18		1	F	1	·66	3	Mr	3○	·19
5	Au	27●○	·37	6	S	25	·90	1	O	25	·43	2	N	23	·96		4	D	23	·49	**58**	6	Jr	22	·03	7	F	20	·56
4	S	15	·27	5	O	14	·80	7	N	13	·33	1	D	12	·86	**59**	3	Jr	11○	·39		4	F	9	·92	6	Mr	11	45
1	S	4	·64	3	O	4	·17	4	N	2	·70	6	D	2	·23		7	D	31○	·76	**60**	2	Jr	30●	·29	3	F	28	·82
6	Au	24	·00	7	S	22	·53	2	O	22	07	3	N	20	·60		5	D	20○	·13	**61**	6	Jr	18	·66	1	F	17	·19
4	S	11	·90	6	O	11	·43	7	N	9	96	2	D	9	·49	**62**	4	Jr	8	·02		5	F	6	55	7	Mr	8	·09
2	S	1	·27	3	S	30	·80	5	O	30	83	6	N	28●	·86		1	D	28	·39	**63**	2	Jr	26	·92	4	F	25	·45
6	Au	21	·64	{ 1	S	20	·17	**Margasira Kshaya.**				4	N	18●	28		5	D	17	·76	**64**	7	Jr	16	·29	{ 1	F	14	·82
				{ 2	O	19○	·70																			{ 3	Mr	15	·35
5	S	8	·53	7	O	8○	·06	1	N	6	·59	3	D	6	·13	**65**	4	Jr	4	66		6	F	3	·19	7	Mr	4	72
2	Au	28	·90	4	S	27○	·43	5	O	26	·96	7	N	25	·49		2	D	25	·02	**66**	3	Jr	23	·55	5	F	22○	·08
1	S	16●	80	3	O	16	·33	4	N	14	·86	6	D	14	·39	**67**	7	Jr	12	.92		2	F	11○	·45	3	Mr	12	·98
6	S	6●	·17	7	O	5	·70	2	N	4	·28	3	D	3	·76	**68**	5	Jr	2	29		6	Jr	31●○	82	1	Mr	1	·85
3	Au	25	·53	5	S	24	·06	6	O	23	·59	1	N	22	·12		2	D	21	65	**69**	4	Jr	20	19	5	F	18	·72

For tithis by Brahma siddhānta add algebraically — ·02 to the above.

TABLE II.—Solar years and new moons

Kaliyuga	Vikrama era	Śaka era	Commencement of solar year: Month and day A.D.	Commencement of solar year: Fraction of day	First new moon in solar year	Anomaly of first new moon	Christian era A.D.	Vaiśākha: Week-day	Vaiśākha: Month	Vaiśākha: Day	Vaiśākha: Fraction	Jyeshṭha: Week-day	Jyeshṭha: Month	Jyeshṭha: Day	Jyeshṭha: Fraction	Āshāḍha: Week-day	Āshāḍha: Month	Āshāḍha: Day	Āshāḍha: Fraction	Śrāvaṇa: Week-day	Śrāvaṇa: Month	Śrāvaṇa: Day	Śrāvaṇa: Fraction	Bhādrapada: Week-day	Bhādrapada: Month	Bhādrapada: Day	Bhādrapada: Fraction
3370	326	191	16M	·5886	3·6587	11·299	**269**	7	Mr	20	·25	1	Ap	18	78	3 4	My Je	18 16	·31 ·84	6	Jl	16●	·37	7	Au	14	·90
3371	327	192	16M	·8473	22·2975	9·482	**270**	6	Ap	8	·14	7	My	7	·67	2	Je	6○	21	3	Jl	5●	74	5	Au	4	·27
3372	328	193	17M	·1061	11·4059	5·589	**271**	3	Mr	28	51	5	Ap	27	·04	6	My	26○	57	1	Je	25●	10	2	Jl	24	·63
3373	329	194	16M	·3649	0·5142	1·747	**272**	7 2	Mr Ap	16 15	·88 ·41	3	My	14○	·94	5	Je	13	·47	7	Jl	13	00	1	Au	11	·58
3374	330	195	16M	·6236	19·1581	27·434	**273**	6	Ap	4	·78	1	My	4●	·31	2	Je	2	84	4	Jl	2	37	5	Jl	31	·90
3375	331	196	16M	·8824	8·2614	28·592	**274**	4	Mr	25○	·14	5	Ap	23●	67	7	My	23	·20	1	Je	21	·73	3 4	Jl Au	21 19	·27 ·80
3376	332	197	17M	1411	26·9002	21·725	**275**	3	Ap	13	·04	4	My	12	·57	6	Je	11	10	7	Jl	10	63	2	Au	9	16
3377	333	198	16M	·3999	16·0085	17·882	**276**	7	Ap	1	·41	1	Ap	30	·94	3	My	30	·47	5	Je	29	·00	6	Jl	28	·58
3378	334	199	16M	·6586	5·1168	14·039	**277**	4	Mr	21	·77	6	Ap	20	·30	7	My	19	·84	2 3	Je Jl	18 17	·38 ·90	5	Au	16	·43
3379	335	200	16M	·9174	23·7557	12·173	**278**	3	Ap	9	·67	5	My	9	·20	6	Je	7	·78	1	Jl	7○	·26	2	Au	5	·79
3380	336	201	17M	·1762	12·8640	8·330	**279**	1	Mr	30	·04	2	Ap	28	·57	4	My	28	·10	5	Je	26●○	63	7	Jl	26	·16
3381	337	202	16M	·4349	1·9723	4·487	**280**	5	Mr	18	·41	6 1	Ap My	16 16	·94 ·47	3	Je	15●	·00	4	Jl	14	·53	6	Au	13	·06
3382	338	203	16M	·6937	20·6112	3·623	**281**	4	Ap	6	·30	5	My	5○	·83	7	Je	4	·37	1	Jl	3	·90	3	Au	2	·43
3383	339	204	16M	·9524	9·7195	26·382	**282**	1	Mr	26	·67	3	Ap	25●○	·20	4	My	24	·73	6	Je	23	·26	7	Jl	22	·79
3384	340	205	17M	·2112	28·3584	24·465	**283**	7	Ap	14●○	·57	2	My	14	·10	3	Je	12	·63	5	Jl	12	·16	6	Au	10	·69
3385	341	206	16M	·4699	17·4667	20·623	**284**	4	Ap	2●	·94	6	My	2	·47	1	Je	1	·00	2	Je	30	·53	4	Jl	30	·06
3386	342	207	16M	·7287	6·5750	16·780	**285**	2	Mr	23	·80	3	Ap	21	·88	5	My	21	·36	6 1	Je Jl	19 19	·89 ·42	2	Au	17○	·96
3387	343	208	16M	·9875	25·2139	14·913	**286**	1	Ap	11	·20	2	My	10	·73	4	Je	9	·26	5	Jl	8	·79	7	Au	7○	·32
3388	344	209	17M	2462	14·3222	11·070	**287**	5	Mr	31	·57	7	Ap	30	·10	1	My	29	·63	3	Je	28	·16	4	Jl	27●	·69
3389	345	210	16M	·5050	3·4305	7·228	**288**	2	Mr	19	·93	4 6	Ap My	18 18	·47 ·00	7	Je	16○	·53	2	Jl	16●	·06	3	Au	14	·59
3390	346	211	16M	·7637	22·0694	5·361	**289**	1	Ap	7	·83	3	My	7	·36	4	Je	5○	·89	6	Jl	5●	·42	7	Au	3	·95
3391	347	212	17M	·0225	11·1777	1·514	**290**	6	Mr	28	·20	7	Ap	26	·78	2	My	26○	·26	3	Je	24	·79	5	Jl	24	·32
3392	348	213	17M	·2812	0·2860	25·230	**291**	3 5	Mr Ap	17 16	·57 ·10	6	My	15●	·63	1	Je	14	·16	2	Jl	13	·69	4	Au	12	·22
3393	349	214	16M	·5400	18·9249	23·363	**292**	2	Ap	4○	·46	3	My	3●	·99	5	Je	2	·53	7	Jl	2	·06	1	Jl	31	·59
3394	350	215	16M	·7987	8·0332	19·521	**293**	6	Mr	24○	·83	1	Ap	23	·36	2	My	22	·89	4	Je	21	·42	5 7	Jl Au	20 19	·95 ·48
3395	351	216	17M	·0575	26·6720	17·654	**294**	5	Ap	12	·73	7	My	12	·26	1	Je	10	·79	3	Jl	10	·32	4	Au	8	·85
3396	352	217	17M	·3163	15·7803	13·811	**295**	3	Ap	2	·10	4	My	1	·63	6	My	31	·16	7	Je	29	·69	2	Jl	29	·22
3397	353	218	16M	·5750	4·8886	9·968	**296**	7	Mr	21	·46	1	Ap	19	·99	3 5	My Je	19 18	·52 ·05	6	Jl	17○	·59	1	Au	16	·12
3398	354	219	16M	·8338	23·5275	8·102	**297**	6	Ap	9	·36	7	My	8	·89	2	Je	7	·42	3	Jl	6●○	·95	5	Au	5	·48
3399	355	220	17M	·0925	12·6358	4·259	**298**	3	Mr	29	·73	5	Ap	28	·26	6	My	27	·79	1	Je	26●	·32	2	Jl	25	·85
3400	356	221	17M	·3513	1·7441	0·416	**299**	1	Mr	19	·09	2 4	Ap My	17 17○	·63 ·16	5	Je	15	·69	7	Jl	15	·22	1	Au	13	·75
3401	357	222	16M	·6100	20·3830	26·104	**300**	6	Ap	5	·99	1	My	5●○	·52	3	Je	4	·05	4	Jl	3	·58	6	Au	2	·11
3402	358	223	16M	8688	9·4913	22·261	**301**	4	Mr	26	·36	5	Ap	24●○	·89	7	My	24	·42	1	Je	22	·95	3	Jl	22	·48
3403	359	224	17M	·1276	28·1302	20·894	**302**	3	Ap	14	·26	4	My	13	·79	6	Je	12	·32	7	Jl	11	·85	2	Au	10	·38
3404	360	225	17M	·3863	17·2385	16·552	**303**	7	Ap	3	·62	2	My	3	·15	3	Je	1	·69	5	Jl	1	·22	6	Jl	30	·75
3405	361	226	16M	·6451	6·3468	12·709	**304**	4	Mr	22	·99	6	Ap	21	·52	1	My	21	·05	2 4	Je Jl	19 19	·58 ·11	5	Au	17○	·64
3406	362	227	16M	·9038	24·9860	10·842	**305**	3	Ap	10	·89	5	My	10	·42	6	Je	8	·95	1	Jl	8	·48	3	Au	7●○	·01
3407	363	228	17M	·1626	14·0940	6·999	**306**	1	Mr	31	·26	2	Ap	29	·79	4	My	29	·32	5	Je	27○	·85	7	Jl	27●	·38
3408	364	229	17M	·4213	3·2023	3·157	**307**	5	Mr	20	·64	7 1	Ap My	19 18	·15 ·68	3	Je	17○	·21	4	Jl	16●	·75	6	Au	15	·28
3409	365	230	16M	·6801	21·8412	1·290	**308**	4	Ap	7	·52	6	My	7	·05	7	Je	5○	·58	2	Jl	5	·11	3	Au	3	·64
3410	366	231	16M	·9389	10·9495	25·002	**309**	1	Mr	27	·89	3	Ap	26	·42	4	My	25	·95	6	Je	24	·48	1	Jl	24	·01
3411	367	232	17M	1976	0·0578	1·159	**310**	6 7	Mr Ap	17 15○	·25 ·79	2	My	15	·32	3	Je	13	·85	5	Jl	13	·38	6	Au	11	·91
3412	368	233	17M	·4564	18·6966	19·292	**311**	5	Ap	5○	·15	6	My	4	·68	1	Je	3	·21	2	Jl	2	·74	4	Au	1	·27
3413	369	234	16M	·7151	7·8049	15·450	**312**	2	Mr	24○	·52	4	Ap	23	·05	5	My	22	·58	7	Je	21	·11	1 3	Jl Au	20 19	·64 ·17
3414	370	235	16M	·9739	26·4438	13·583	**313**	1	Ap	12	·42	2	My	11	·95	4	Je	10	·48	6	Jl	10	·01	7	Au	8	·54
3415	371	236	17M	·2326	15·5521	9·740	**314**	5	Ap	1	·78	7	My	1	·31	1	My	30	·85	3	Je	29	·38	4	Jl	28○	·91
3416	372	237	17M	·4914	4·6604	5·897	**315**	3	Mr	22	·15	4	Ap	20	·68	6 7	My Je	20 18	·21 ·74	2	Jl	18○	·27	3	Au	16	·80
3417	373	238	16M	·7501	23·2993	4·031	**316**	2	Ap	9	·05	3	My	8	·58	5	Je	7	·11	6	Jl	6●	·64	1	Au	5	·17
3418	374	239	17M	·0089	12·4076	0·187	**317**	6	Mr	29	·42	7	Ap	27	·95	2	My	27○	·48	4	Je	26	·01	5	Jl	25	·54
3419	375	240	17M	·2677	1·5159	23·900	**318**	3	Mr	18	·78	5 6	Ap My	17 16○	·31 ·84	1	Je	15	·37	2	Jl	14	·91	4	Au	13	·44
3420	376	241	17M	·5264	20·1548	22·083	**319**	2	Ap	6	·68	4	My	6○	·21	5	Je	4	74	7	Jl	4	·27	1	Au	2	·80
3421	377	242	16M	·7852	9·2631	18·190	**320**	7	Mr	26	·05	1	Ap	24●	·58	3	My	24	·11	4	Je	22	·64	6	Jl	22	·17
3422	378	243	17M	·0439	27·9020	16·328	**321**	5	Ap	13	·95	7	My	13	·48	2	Je	12	·01	3	Jl	11	·54	5	Au	10	·07

* Ending moments of tithis by Ārya siddhānta are the same as those given above.

from 1 B.C. to A.D. 500 (Sūrya siddhānta)*—cont.

Āśvina.				Kārttika.				Mārgaśīrsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day	Fraction	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
2	S	13	·43	3	O	12	·96	5	N	11	49	7	D	11	·02	**70**	7	Jr	9	55		3	F	8	·08	4	Mr	9	·61
6	S	2	80	1	O	2	83	2	O	31	·86	4	N	30○	39		5	D	29	92	**71**	7	Jr	28	·45	1	F	26	·98
4	Au	23	·16	5	S	21	·69	7	O	21	22	1	N	19●○	76		3	D	19	·29	**72**	4	Jr	17	·82	6	F	26	·35
3	S	10	·06	4	O	9	·59	6	N	8●○	12	7	D	7	65	**73**	2	Jr	6	·18		3	F	4	·71	5	Mr	6	·25
7	Au	30	43	1	S	28○	96	3	O	28	·49	5	N	27	02		6	D	26	55	**74**	1	Jr	25	·08	2	F	23	·61
6	S	18○	·83	7	O	17	·86	2	N	16	39	3	D	15	92	**75**	5	Jr	14	·45		6	F	12	98	1	Mr	14○	·51
3	S	7●○	·69	5	O	7	·22	6	N	5	75	1	D	5	29	**76**	2	Jr	3	·82		4	F	2	·35	5	Mr	2●○	·88
1	Au	27●	·06	2	S	25	59	4	O	25	12	5	N	23	65		7	D	23	18	**77**	1	Jr	21○	71	3	F	20●	·24
6	S	14	·96	1	O	14	·49	3	N	13	·02	4	D	12	·55	**78**	6	Jr	11○	·08		7	F	9●	·61	2	Mr	11	·14
4	S	4	·83	5	O	3	·86	7	N	2	·39	1	D	1	·92		3	D	31○	·45	**79**	4	Jr	29	·98	6	F	28	·51
1	Au	24	·69	3	S	23	·22	4	O	22	·75	6	N	21	·28		7	D	20●	·81	**80**	2	Jr	19	·35	3	F	17	·88
7	S	11	·59	2	O	11	·12	3	N	9	·65	5	D	9●	18	**81**	6	Jr	7	·71		1	F	6	·24	2	Mr	7	·77
4	Au	31	·96	6	S	30	·46	1	O	30○	·02	2	N	28	55		4	D	28	·08	**82**	5	Jr	26	·61	7	F	25	·14
2 3	Au S	21 19	·82 ·85	5	O	19○	36	Margasira Kshaya.				6	N	17	·92		1	D	17	45	**83**	2	Jr	15	·98	4 6	F Mr	14 16	·51 ·04
1	S	9	·22	2	O	8●○	·75	4	N	7	·28	5	D	6	·81	**84**	7	Jr	5	34		1	F	3	·87	3	Mr	4	·41
5	Au	28	·59	7	S	27●	·12	1	O	26	·65	3	N	25	·18		4	D	24	·71	**85**	6	Jr	28	·24	7	F	21○	·77
4	S	16●	·49	6	O	16	·02	7	N	14	·55	2	D	14	·08	**86**	3	Jr	12	·61		5	F	11●○	14	6	Mr	12	·67
1	S	5	·85	3	O	5	·38	4	N	3	·91	6	D	3	·45	**87**	7	Jr	1	·98		2	Jr	31●	·51	4	Mr	2	·04
6	Au	26	22	7	S	24	·75	2	O	24	·28	3	N	22	·81		5	D	22	·34	**88**	6	Jr	20	·87	1	F	19	·40
5	S	13	·12	6	O	12	·65	1	N	11	·18	2	D	10○	·71	**89**	4	Jr	9	·24		5	F	7	·77	7	Mr	9	·30
2	S	2	·49	4	O	2	02	5	O	31	·55	7	N	30●○	·08		1	D	29	·61	**90**	3	Jr	28	·14	4	F	26	·67
6	Au	22	·85	1	S	21	·38	2	O	20	·91	4	N	19●○	·44		5	D	18	·97	**91**	7	Jr	17	·51	2	F	16	·04
5	S	10	·75	7	O	10○	·28	1	N	8	·81	3	D	8	·34	**92**	4	Jr	6	·87		6	F	5	40	7	Mr	5	·98
3	Au	30	12	4	S	28○	·65	6	O	28	·18	7	N	26	·71		2	D	26	·24	**93**	3	Jr	24	·77	5	F	23	·30
2	S	18●○	·01	3	O	17	·55	5	N	16	·08	6	D	15	·61	**94**	1	Jr	14	·14		2	F	12	·67	4	Mr	14●○	·20
6	S	7●	·38	7	O	6	·91	2	N	5	·44	3	D	4	·97	**95**	5	Jr	3	·50		7	F	2○	·03	1	Mr	3●	·57
3	Au	27	·75	5	S	26	·28	6	O	25	·81	1	N	24	·34		2	D	23	·87	**96**	4	Jr	22○	·40	5	F	20	·93
2	S	14	·65	4	O	14	·18	5	N	12	71	7	D	12	·24	**97**	1	Jr	10○	·77		3	F	9	·30	4	Mr	10	·83
7	S	4	·01	1	O	3	·54	3	N	2	·07	4	D	1	·61		6	D	31●	·14	**98**	7	Jr	29	·67	2	F	28	·20
4	Au	24	·38	5	S	22	·91	7	O	22	·44	1	N	20	·97		3	D	20●	·50	**99**	5	Jr	19	·08	6	F	17	·58
3	S	12	·28	4	O	11	81	6	N	10○	·84	7	D	9●	·87	**300**	3	Jr	8	·40		4	F	6	·93	6	Mr	7	·46
7	Au	31	·65	2	S	30	·18	3	O	29○	·71	5	N	28	·24		6	D	27	·77	**01**	1	Jr	26	·30	2	F	24	·83
5 6	Au S	21 19	·01 ·54	1	O	19○	·07	2	N	17	·60	4	D	17	·13	**02**	5	Jr	15	·67		7	F	14	·20	1	Mr	15	·73
3	S	8	·91	5	O	8●	·44	6	N	6	·97	1	D	6	50	**03**	3	Jr	5	·03		4	F	3	·56	6	Mr	5○	·09
1	Au	29○	·28	2	S	27	·81	4	O	27	·34	5	N	25	·87		7	D	25	·14	**04**	1	Jr	23	·93	3	F	22●○	·46
7	S	16	·17	1	O	15	·71	3	N	14	·24	4	D	13	·77	**05**	6	Jr	12	·30		7	F	10	·83	2	Mr	12	·36
4	S	5	·54	6	O	5	·07	7	N	3	·60	2	D	3	·13	**06**	3	Jr	1	·66		5	Jr	31	·19	6	Mr	1	·73
1	Au	25	·91	3	S	24	·44	4	O	23	·97	6	N	22	·50		1	D	22○	·03	**07**	2	Jr	20	·56	4	F	19	·09
7	S	13	·81	2	O	13	·34	3	N	11	·87	5	D	11○	·40	**08**	6	Jr	9	·93		1	F	8	·46	2	Mr	8	·99
5	S	2	·17	6	O	1	·70	1	O	31	·23	2	N	29●○	·77		4	D	29	·30	**09**	5	Jr	27	·88	7	F	26	·36
2	Au	22	·54	4	S	21	·07	5	O	20	·60	7	N	19	·13		1	D	18	·66	**10**	3	Jr	17	·19	4	F	15	·72
1	S	10	·44	2	O	9○	·97	4	N	8	·50	6	D	8	·03	**11**	7	Jr	6	·56		2	F	5	·09	3	Mr	6	·62
5	Au	30	·81	7	S	29○7	·34	1	O	28	87	3	N	27	·40		4	D	26	·93	**12**	6	Jr	25	·46	7	F	23	·99
4	S	17	·70	6	O	17	·28	7	N	15	·76	2	D	15	·29	**13**	3	Jr	13	·83		5	F	12○	·36	6	Mr	13	·89
2	S	7●	·07	3	O	6	·60	5	N	5	·13	6	D	4	·66	**14**	1	Jr	3	·19		2	F	1○	·72	4	Mr	3●	·25
6	Au	27	·44	7	S	25	·97	2	O	25	50	4	N	24	·08		5	D	23	·56	**15**	7	Jr	22○	·09	1	F	20	·62
5	S	15	·33	6	O	14	·87	1	N	13	·40	2	D	12	·93	**16**	4	Jr	11	·46		5	F	9	·99	7	Mr	10	·52
2	S	3	·70	4	O	3	·23	5	N	1	·76	7	D	1	·29		1	D	30●	·82	**17**	3	Jr	29	·35	4	F	27	·89
7	Au	24	·07	1	S	22	·60	3	O	22	·13	4	N	20○	·66		6	D	20	·19	**18**	7	Jr	18	·72	2	F	17	·25
[illegible]	S	11	·97	7	O	11	·50	2	N	10○	·08	3	D	9	·56	**19**	5	Jr	8	·09		6	F	6	·62	1	Mr	8	·15
3	S	1	·33	4	S	30	·86	6	O	30○	·39	7	N	28	·93		2	D	28	·46	**20**	3	Jr	26	·99	5	F	25	·52
7 2	Au S	20 19	·70 ·23	3	O	18●	·76	5	N	17	·29	6	D	16	·82	**21**	1	Jr	15	·85		2	F	13	·88	4	Mr	15○	·41
6	S	8○	·60	1	O	8	·13	2	N	6	·66	4	D	6	·19	**22**	5	Jr	4	·72		7	F	3	·25	1	Mr	4○	·78

For tithis by Brahma siddhānta add algebraically —·02 to the above.

from 1 B.C. to A.D. 500 (Sūrya siddhānta)*—*cont.*

Āśvinā.				Kārttika.				Mārgaśīrsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day	Fraction.	Week-day	Month.	Day.	Fraction.		Week day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
3	Au	28○	·97	5	S	27	·50	7	O	27	·08	1	N	25	56		3	D	25	·09	**23**	4	Jr	23	·62	6	F	22	·15
2	S	16	·86	4	O	16	·39	5	N	14	·92	7	D	14	·45	**24**	1	Jr	12	·99		3	F	11●	·52	5	Mr	12	·05
7	S	5	·23	1	O	4	·76	3	N	3	29	4	D	2	82	**25**	6	Jr	1○	·35		7	Jr	30	·88	2	Mr	1	·41
4	Au	25	·60	6	S	24	13	7	O	28	·66	2	N	22	19		3	D	21●○	·72	**26**	5	Jr	20	·25	6	F	18	·78
3	S	13	·49	5	O	13	·03	6	N	11	56	1	D	11●○	09	**27**	2	Jr	9	·62		4	F	8	15	5	Mr	9	68
7	S	2	·80	2	O	2	·39	3	O	31	·92	5	N	30	45		6	D	29	·98	**28**	1	Jr	28	·51	3	F	27	·05
5	Au	22	·23	6	S	20	76	1	O	20○	·29	2	N	18	82		4	D	18	35	**29**	5	Jr	16	88	7	F	15	41
4	S	10	·13	5	O	9●○	·66	7	N	8	·19	1	D	7	72	**30**	3	Jr	6	25		4	F	4	78	6	Mr	6	·31
1	Au	30	49	3	S	29	·02	4	O	28	55	6	N	27	09		7	D	26	·62	**31**	2	Jr	25	·15	3	F	23○	·68
7	S	18	·39	1	O	17	·92	3	N	16	45	4	D	15	98	**32**	6	Jr	14	51		1	F	13○	04	2	Mr	13●	·57
4	S	6	76	6	O	6	·29	7	N	4	82	2	D	4	35	**33**	3	Jr	2	88		5	F	1●○	·41	6	Mr	2	·94
2	Au	27	·13	3	S	25	·66	5	O	25	19	6	N	23	·72		1	D	23	·25	**34**	2	Jr	21●	78	4	F	20	·31
1	S	15	·02	2	O	14	·55	4	N	13	08	5	D	12	61	**35**	7	Jr	11	15		1	F	9	·68	3	Mr	11	·21
5	S	4	·39	6	O	3	·92	1	N	2	45	2	D	1○	98		4	D	31	51	**36**	6	Jr	30	·04	7	F	28	·57
2	Au	23	76	4	S	22	·29	5	O	21	·82	7	N	20○	35		1	D	19	88	**37**	3	Jr	18	41	4	F	16	·94
1	S	11	65	3	O	11	·19	4	N	9○	·72	6	D	9	25	**38**	7	Jr	7	·78		2	F	6	31	3	Mr	7	·84
6	S	1	·02	7	S	30	·55	2	O	30	08	3	N	28	61		5	D	28	14	**39**	6	Jr	26	·67	1	F	25	·21
{3	Au	21	39	6	O	19●	45	7	N	17	98	2	D	17	51	**40**	4	Jr	16	04		5	F	14	·57	7	Mr	15○	·10
{4	S	19○	92																										
2	S	8○	·29	3	O	7	82	5	N	6	·35	6	D	5	88	**41**	1	Jr	4	41		2	F	2	·94	4	Mr	4●	·47
6	Au	28○	65	1	S	27	·18	2	O	26	·71	4	N	25	25		5	D	24	·78	**42**	7	Jr	23	·31	1	F	21	·84
5	S	16	·55	7	O	16	·08	1	N	14	61	3	D	14	·14	**43**	4	Jr	12○	67		6	F	11	·20	7	Mr	12	·73
2	S	5	·92	4	O	5	45	5	N	3	98	7	D	3	51	**44**	2	Jr	2○	·04		3	Jr	31	57	4	Mr	1	·10
7	Au	25	·29	1	S	23	·82	3	O	28	·35	4	N	21	·88		6	D	21○	41	**45**	7	Jr	19	·94	2	F	18	·47
6	S	13	·18	7	O	12	·71	2	N	11	24	3	D	10	77	**46**	5	Jr	9	31		6	F	7	84	1	Mr	9	·37
3	S	2	·55	5	O	2	·08	6	O	31○	61	1	N	30	·14		2	D	29	67	**47**	4	Jr	28	·20	5	F	26	·73
7	Au	22	92	2	S	21	.45	3	O	20○	·98	5	N	19	·51		7	D	19	·04	**48**	1	Jr	17	·57	{3	F	16	·10
																										{4	Mr	16	·63
6	S	9	·81	1	O	9●	35	2	N	7	·88	4	D	7	·41	**49**	5	Jr	5	·94		7	F	4	47	2	Mr	6	·00
4	Au	30	·18	5	S	28	·71	7	O	28	·24	1	N	26	·77		3	D	26	30	**50**	4	Jr	24	·88	6	F	23○	·37
3	S	18	·08	4	O	17	·61	6	N	16	14	7	D	15	·67	**51**	2	Jr	14	·20		3	F	12○	73	5	Mr	14	·26
7	S	7	45	1	O	6	·98	3	N	5	·51	5	D	5	·04	**52**	6	Jr	3	·57		1	F	2●	·10	2	Mr	2	·63
4	Au	26	·81	6	S	25	·34	7	O	24	·87	2	N	23	·41		3	D	22	·94	**53**	5	Jr	21	·47	7	F	20	·00
3	S	14	·71	5	O	14	·24	6	N	12	·77	1	D	12○	·30	**54**	2	Jr	10●	·83		4	F	9	36	5	Mr	10	·89
1	S	4	·08	2	O	3	·61	4	N	2	14	5	D	1○	·67		7	D	31	·20	**55**	1	Jr	29	·73	3	F	28	26
5	Au	24	·45	6	S	22	·98	1	O	22	·51	3	N	21○	·04		4	D	20	·57	**56**	6	Jr	19	10	7	F	17	63
4	S	11	·34	5	O	10	·87	7	N	9●	·40	1	D	8	·93	**57**	3	Jr	7	·47		5	F	6	00	6	Mr	7	·53
1	Au	31	·71	3	S	30○	·24	4	O	29	·77	6	N	28	·30		7	D	27	83	**58**	2	Jr	26	86	3	F	24	·89
{6	Au	21	·08	2	O	19	·14	3	N	17	67	5	D	17	·20	**59**	6	Jr	15	·73		1	F	14	·26	2	Mr	15○	·79
{7	S	19○	·61																										
4	S	8●○	·97	6	O	8	·51	1	N	7	·04	2	D	6	·57	**60**	4	Jr	5	·10		5	F	3	63	7	Mr	4●	·16
2	Au	28●	·34	3	S	26	87	5	O	26	40	6	N	24	93		1	D	24	·46	**61**	2	Jr	22○	·99	4	F	21	·53
1	S	16	·24	2	O	15	·77	4	N	14	·80	5	D	13	·83	**62**	7	Jr	12○	·36		1	F	10	89	3	Mr	12	42
5	S	5	·61	7	O	5	·14	1	N	3	·67	3	D	3	·20	**63**	4	Jr	1●○	·73		6	Jr	31	26	7	Mr	1	76
2	Au	25	·97	4	S	24	·50	6	O	24	·03	7	N	22	·57		2	D	22	·10	**64**	3	Jr	20	63	5	F	19	·19
1	S	12	·87	3	O	12	·40	4	N	10○	·93	6	D	10	·46	**65**	7	Jr	8	·99		2	F	7	·52	4	Mr	9	·08
6	S	2	·24	7	O	1	·77	2	O	31○	·30	3	N	29	·83		5	D	29	·36	**66**	6	Jr	27	89	1	F	26	42
3	Au	22	·61	5	S	21	·14	6	O	20○	·67	1	N	19	·20		2	D	18	·73	**67**	{4	Jr	17	·26	7	Mr	17	·32
																						{5	F	15	·79				
2	S	10	·50	4	O	10●	·03	5	N	8	·56	7	D	8	·09	**68**	1	Jr	6	·63		3	F	5	·16	4	Mr	5○	·69
6	Au	29○	·87	1	S	28	·40	2	O	27	·93	4	N	26	·46		5	D	25	·99	**69**	7	Jr	24	52	2	F	23○	05
5	S	17	·77	7	O	17	·30	1	N	15	·83	3	D	15	·36	**70**	4	Jr	13	·89		6	F	12	·42	7	Mr	13	95
3	S	7	·13	4	O	6	·67	6	N	5	·20	7	D	4	·73	**71**	2	Jr	3	26		3	F	1●	·79	5	Mr	3	·32
7	Au	27	·50	2	S	26	·08	3	O	25	·56	5	N	24	·09		6	D	28○	·62	**72**	1	Jr	22	·15	2	F	20	·69
6	S	14	·40	7	O	13	·93	2	N	12	·46	3	D	11○	·99	**73**	5	Jr	10	·52		7	F	9	·05	1	Mr	10	·58
3	S	3	·77	5	O	3	·30	6	N	1	·83	1	D	1○	·36		2	D	30	·89	**74**	4	Jr	29	·42	5	F	27	·95
1	Au	24	·18	2	S	22	·66	4	O	22	·19	5	N	20●	·73		7	D	20	·26	**75**	1	Jr	18	79	3	F	17	·82

*For tithis by Brahma siddhānta add algebraically —·02 to the above.

from 1 B.C. to A.D. 500 (Sūrya siddhânta)*—*cont.*

Âśvinâ.				Kârttika.				Mârgaśirsha.				Pausha.				A.D.	Mâgha.				A.D.	Phâlguna.				Chaitra.			
Week-day.	Month	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week day.	Month	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
3	Au	28○	·97	5	S	27	·50	7	O	27	·03	1	N	25	56		3	D	25	·09	**23**	4	Jr	23	·62	6	F	22	·15
2	S	16	·86	4	O	16	·39	5	N	14	·92	7	D	14	·45	**24**	1	Jr	12	·99		3	F	11●	·52	5	Mr	12	·05
7	S	5	·23	1	O	4	·76	3	N	3	29	4	D	2	82	**25**	6	Jr	1○	·35		7	Jr	30	·88	2	Mr	1	·41
4	Au	25	·60	6	S	24	·13	7	O	23	·66	2	N	22	19		3	D	21●○	·72	**26**	5	Jr	20	·25	6	F	18	·78
3	S	13	·49	5	O	13	·03	6	N	11	56	1	D	11●○	09	**27**	2	Jr	9	·62		4	F	8	15	5	Mr	9	·68
7	S	2	·80	2	O	2	·39	3	O	31	·92	5	N	30	45		6	D	29	·98	**28**	1	Jr	28	·51	3	F	27	05
5	Au	22	·23	6	S	20	76	1	O	20○	·29	2	N	18	82		4	D	18	35	**29**	5	Jr	16	88	7	F	15	41
4	S	10	·13	5	O	9●○	·66	7	N	8	·19	1	D	7	72	**30**	3	Jr	6	25		4	F	4	78	6	Mr	6	·31
1	Au	30	49	3	S	29	·02	4	O	28	55	6	N	27	09		7	D	26	62	**31**	2	Jr	25	·15	3	F	23○	·68
7	S	18	·39	1	O	17	·92	3	N	16	·45	4	D	15	98	**32**	6	Jr	14	51		1	F	13○	04	2	Mr	13●	57
4	S	6	76	6	O	6	·29	7	N	4	82	2	D	4	35	**33**	3	Jr	2	88		5	F	1●○	·41	6	Mr	2	·94
2	Au	27	·13	3	S	25	·66	5	O	25	19	6	N	23	·72		1	D	23	·25	**34**	2	Jr	21●	·78	4	F	20	·31
1	S	15	·02	2	O	14	·55	4	N	13	08	5	D	12	61	**35**	7	Jr	11	15		1	F	9	·68	8	Mr	11	·21
5	S	4	·39	6	O	3	·92	1	N	2	45	2	D	1○	98		4	D	31	51	**36**	6	Jr	30	·04	7	F	28	·57
2	Au	23	76	4	S	22	·29	5	O	21	·82	7	N	20○	35		1	D	19	·88	**37**	8	Jr	18	41	4	F	16	·94
1	S	11	65	3	O	11	·19	4	N	9○	72	6	D	9	25	**38**	7	Jr	7	·78		2	F	6	·31	3	Mr	7	·84
6	S	1	·02	7	S	30	·55	2	O	30	·08	3	N	28	61		5	D	28	14	**39**	6	Jr	26	·67	1	F	25	·21
{8 4	Au S	21 19○	·39 92	6	O	19●	45	7	N	17	98	2	D	17	51	**40**	4	Jr	16	04		5	F	14	·57	7	Mr	15○	·10
2	S	8○	·29	3	O	7	82	5	N	6	·35	6	D	5	88	**41**	1	Jr	4	41		2	F	2	·94	4	Mr	4●	·47
6	Au	28○	65	1	S	27	·18	2	O	26	·71	4	N	25	25		5	D	24	78	**42**	7	Jr	23	·31	1	F	21	·84
5	S	16	·55	7	O	16	·08	1	N	14	·61	3	D	14	·14	**43**	4	Jr	12○	67		6	F	11	20	7	Mr	12	·73
2	S	5	·92	4	O	5	·45	5	N	3	98	7	D	3	51	**44**	2	Jr	2○	·04		3	Jr	31	·57	4	Mr	1	·10
7	Au	25	·29	1	S	23	·82	3	O	23	·35	4	N	21	·88		6	D	21○	41	**45**	7	Jr	19	·94	2	F	18	·47
6	S	13	·18	7	O	12	·71	2	N	11	24	3	D	10	77	**46**	5	Jr	9	31		6	F	7	84	1	Mr	9	·87
3	S	2	·55	5	O	2	·08	6	O	31○	·61	1	N	30	·14		2	D	29	·67	**47**	4	Jr	28	·20	5	F	26	·73
7	Au	22	92	2	S	21	45	3	O	20○	·98	5	N	19	·51		7	D	19	·04	**48**	1	Jr	17	·57	{3 4	F Mr	16 16	·10 ·63
6	S	9	·81	1	O	9●	·35	2	N	7	88	4	D	7	·41	**49**	5	Jr	5	·94		7	F	4	47	2	Mr	6	·00
4	Au	30	·18	5	S	28	·71	7	O	28	·24	1	N	26	·77		3	D	26	·30	**50**	4	Jr	24	·88	6	F	23○	·37
3	S	18	·08	4	O	17	·61	6	N	16	14	7	D	15	·67	**51**	2	Jr	14	·20		3	F	12○	·73	5	Mr	14	·26
7	S	7	45	1	O	6	·98	3	N	5	·51	5	D	5	04	**52**	6	Jr	3	·57		1	F	2●	·10	2	Mr	2	·63
4	Au	26	·81	6	S	25	·34	7	O	24	·87	2	N	23	·41		3	D	22	·94	**53**	5	Jr	21	·47	7	F	20	·00
3	S	14	·71	5	O	14	·24	6	N	12	77	1	D	12○	·30	**54**	2	Jr	10●	·83		4	F	9	36	5	Mr	10	·89
1	S	4	·08	2	O	3	·61	4	N	2	14	5	D	1○	·67		7	D	31	·20	**55**	1	Jr	29	·73	3	F	28	·26
5	Au	24	·45	6	S	22	·98	1	O	22	·51	3	N	21○	04		4	D	20	·57	**56**	6	Jr	19	10	7	F	17	63
4	S	11	·34	5	O	10	·87	7	N	9●	·40	1	D	8	·93	**57**	3	Jr	7	·47		5	F	6	00	6	Mr	7	·53
1	Au	31	·71	3	S	30○	·24	4	O	29	·77	6	N	28	·30		7	D	27	83	**58**	2	Jr	26	86	3	F	24	·89
6 7	Au S	21 19○	·08 ·61	2	O	19	·14	3	N	17	·67	5	D	17	·20	**59**	6	Jr	15	·73		1	F	14	26	2	Mr	15○	·79
4	S	8●○	·97	6	O	8	·51	1	N	7	·04	2	D	6	·57	**60**	4	Jr	5	·10		5	F	3	63	7	Mr	4●	·16
2	Au	28●	·34	3	S	26	·87	5	O	26	40	6	N	24	98		1	D	24	·46	**61**	2	Jr	22○	·99	4	F	21	·53
1	S	16	·24	2	O	15	·77	4	N	14	·30	5	D	13	·83	**62**	7	Jr	12○	·36		1	F	10	89	3	Mr	12	·42
5	S	5	·61	7	O	5	14	1	N	3	·67	3	D	3	20	**63**	4	Jr	1●○	·73		6	Jr	31	26	7	Mr	1	76
2	Au	25	·97	4	S	24	·50	6	O	24	·03	7	N	22	·57		2	D	22	·10	**64**	3	Jr	20	63	5	F	19	·19
1	S	12	·87	3	O	12	·40	4	N	10○	·93	6	D	10	·46	**65**	7	Jr	8	·99		2	F	7	·52	4	Mr	9	08
6	S	2	·24	7	O	1	·77	2	O	31○	·30	3	N	29	·83		5	D	29	·36	**66**	6	Jr	27	89	1	F	26	42
3	Au	22	·61	5	S	21	·14	6	O	20○	·67	1	N	19	·20		2	D	18	·73	**67**	{4 5	Jr F	17 15	·26 ·79	7	Mr	17	·32
2	S	10	·50	4	O	10●	·03	5	N	8	·56	7	D	8	·09	**68**	1	Jr	6	·63		8	F	5	·16	4	Mr	5○	·69
6	Au	29○	·87	1	S	28	·40	2	O	27	93	4	N	26	·46		5	D	25	·99	**69**	7	Jr	24	52	2	F	23○	·05
5	S	17	·77	7	O	17	·30	1	N	15	·83	3	D	15	·36	**70**	4	Jr	13	·89		6	F	12	·42	7	Mr	13	·95
8	S	7	·18	4	O	6	·67	6	N	5	·20	7	D	4	·73	**71**	2	Jr	3	·26		8	F	1●	79	5	Mr	3	·32
7	Au	27	·50	2	S	26	·08	3	O	25	·56	5	N	24	·09		6	D	23○	·62	**72**	1	Jr	22	·15	2	F	20	·69
6	S	14	·40	7	O	13	·93	2	N	12	·46	3	D	11○	·99	**73**	5	Jr	10	·52		7	F	9	05	1	Mr	10	·58
3	S	3	·77	5	O	3	·30	6	N	1	·83	1	D	1○	·36		2	D	30	·89	**74**	4	Jr	29	·42	5	F	27	·95
1	Au	24	·18	2	S	22	·66	4	O	22	·19	5	N	20●	·73		7	D	20	·26	**75**	1	Jr	18	79	3	F	17	·32

For tithis by Brahma siddhânta add algebraically —·02 to the above.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era.	Vaiśākha.				Jyeshṭha.				Āshāḍha.				Śrāvaṇa.				Bhādrapada.			
							A.D	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
3476	432	297	18M	·0168	0 8313	11 687	**375**	4 6	Mr Ap	18 17○	·85 ·88	7	My	16	·91	2	Je	15	·44	3	Jl	14	·97	5	Au	13	·50
3477	433	298	17M	2755	19·4702	9 820	**376**	3	Ap	5○	·75	5	My	5	·28	6	Je	8	·81	1	Jl	3	·34	2	Au	1	·87
3478	434	299	17M	·5843	8 5785	5·977	**377**	1	Mr	26○	·11	2	Ap	24	·64	4	My	24	·17	5	Je	22	·70	7 1	Jl Au	22 20	·23 ·77
3479	435	300	17M	·7930	27·2174	4·110	**378**	7	Ap	14	·01	1	My	13	·54	3	Je	12	·07	4	Jl	11	·60	6	Au	10	·13
3480	436	301	18M	0518	16 3259	0·268	**379**	4	Ap	3	·38	5	My	2	·91	7	Je	1	·44	1	Je	30	·97	3	Jl	30○	·50
3481	437	302	17M	·3106	5 4340	23 979	**380**	1	Mr	22	·74	3	Ap	21	·27	4 6	My Je	20 19	·81 ·34	7	Jl	18○	·87	2	Au	17	·40
3482	438	303	17M	5693	24·0729	22 112	**381**	7	Ap	10	·64	2	My	10	·17	3	Je	8	70	5	Jl	8●	·28	6	Au	6	·76
3483	439	304	17M	8281	13·1812	18 270	**382**	5	Mr	31	·01	6	Ap	29	·54	1	My	29○	·07	2	Je	27	60	4	Jl	27	·13
3484	440	305	18M	0868	2 2895	14 427	**383**	2	Mr	20	·38	3 5	Ap My	18 18○	·91 ·44	6	Je	16	·97	1	Jl	16	·50	3	Au	15	·03
3485	441	306	17M	3456	20 9283	12 560	**384**	1	Ap	7	·27	2	My	6○	80	4	Je	5	33	5	Jl	4	·87	7	Au	3	·40
3486	442	307	17M	·6043	10 0366	8 718	**385**	5	Mr	27	·64	7	Ap	26●	·17	1	My	25	·70	3	Je	24	·23	4	Jl	23	·76
3487	443	308	17M	8631	28 6755	6 851	**386**	4	Ap	15●	·54	6	My	15	·07	7	Je	13	·60	2	Jl	13	·13	3	Au	11	·66
3488	444	309	18M	1219	17 7838	3·008	**387**	1	Ap	4	·91	3	My	4	·44	4	Je	2	·97	6	Jl	2	·50	1	Au	1	·03
3489	445	310	17M	·3806	6 8921	26 720	**388**	6	Mr	24	·27	7	Ap	22	·80	2	My	22	·33	3 5	Je Jl	20 20	·86 ·39	6	Au	18●○	·93
3490	446	311	17M	·6894	25 5310	24 853	**389**	5	Ap	12	·17	6	My	11	70	1	Je	10	·23	2	Jl	9	·76	4	Au	8	·29
3491	447	312	17M	8981	14 6393	21 011	**390**	2	Ap	1	54	4	My	1	·07	5	My	30	·60	7	Je	29○	·13	1	Jl	28	·66
3492	448	313	18M	·1569	3 7476	17 168	**391**	6	Mr	21	·90	1	Ap	20	·43	2 4	My Je	19 18○	·97 ·50	6	Jl	18	·03	7	Au	16	·56
3493	449	314	17M	·4156	22·3865	15 301	**392**	5	Ap	8	·80	7	My	8	·33	1	Je	6●	86	3	Jl	6	·39	4	Au	4	·92
3494	450	315	17M	·6744	11·4948	11 458	**393**	3	Mr	29	·17	4	Ap	27○	·70	6	My	27●	.23	7	Je	35	·76	2	Jl	25	·29
3495	451	316	17M	.9332	0·6081	7·616	**394**	7 2	Mr Ap	18 17●○	·54 ·07	3	My	16	60	5	Je	15	·13	6	Jl	14	·66	1	Au	13	·19
3496	452	317	18M	·1919	19·2420	5·749	**395**	6	Ap	6●○	·43	7	My	5	·96	2	Je	4	·49	4	Jl	4	·03	5	Au	2	·56
3497	453	318	17M	·4507	8·3503	1·906	**396**	3	Mr	25	·80	5	Ap	24	·33	6	My	23	·86	1	Je	22	·39	2 4	Jl Au	21 20	92 ·45
3498	454	319	17M	·7094	26·9892	0·039	**397**	2	Ap	13	·70	4	My	13	·28	5	Je	11	·76	7	Jl	11	·29	1	Au	9○	82
3499	455	320	17M	·9682	16·0975	23 751	**398**	7	Ap	8	·07	1	My	2	·60	3	Je	1	·18	4	Je	30	66	6	Jl	30○	·19
3500	456	321	18M	·2269	5·2058	19 908	**399**	4	Mr	23	·43	5	Ap	21	·96	7 2	My Je	21 20	·49 ·02	3	Jl	19●	·55	5	Au	18	·09
3501	457	322	17M	·4857	23 8447	18 042	**400**	3	Ap	10	·33	4	My	9	·86	6	Je	8○	39	7	Jl	7●	·92	2	Au	6	45
3502	458	323	17M	·7444	12·9580	14·199	**401**	7	Mr	30	·70	2	Ap	29	·23	3	My	28○	·76	5	Je	27	·29	6	Jl	26	·82
3503	459	324	18M	·0032	2·0613	10·356	**402**	5	Mr	20	·06	6 1	Ap My	18 18●○	·59 ·13	2	Je	16	·66	4	Jl	16	·19	5	Au	14	·72
3504	460	325	18M	·2620	20·7001	8 489	**403**	3	Ap	7	·96	5	My	7●	·49	7	Je	6	·02	2	Jl	5	·55	3	Au	4	·08
3505	461	326	17M	·5207	9·8084	4 647	**404**	1	Mr	27○	·33	2	Ap	25	·86	4	My	25	·39	6	Je	24	·92	7	Jl	23	·45
3506	462	327	17M	·7795	28 4473	2·780	**405**	7	Ap	15	.23	1	My	14	.76	2	Je	13	·29	4	Jl	12	·82	6	Au	11	85
3507	463	328	18M	·0382	17.5556	26·492	**406**	4	Ap	4	·59	6	My	4	·12	7	Je	2	·65	2	Jl	2	·19	3	Jl	31	·72
3508	464	329	18M	·2970	6·6639	22·649	**407**	1	Mr	24	·96	3	Ap	23	·49	5	My	23	·02	6 1	Je Jl	21 21	55 ·08	2	Au	19●	·61
3509	465	330	17M	·5557	25·3028	20·782	**408**	7	Ap	11	·86	2	My	11	·39	3	Je	9	·92	5	Jl	9○	·45	6	Au	7	·98
3510	466	331	17M	·8145	14·4111	16·939	**409**	5	Ap	1	·28	6	Ap	30	·76	1	My	30	·29	2	Je	28●○	·82	4	Jl	28	·35
3511	467	332	18M	·0732	3·5194	18·097	**410**	2	Mr	21	·59	4	Ap	20	·12	5 7	My Je	19 18●	·65 ·18	1	Jl	17	·71	3	Au	16	·25
3512	468	333	18M	·3320	22·1583	11·230	**411**	1	Ap	9	·49	3	My	9○	·02	4	Je	7	·55	6	Jl	7	·08	1	Au	5	·61
3513	469	334	17M	·5908	11·2666	7·387	**412**	5	Mr	28	·86	7	Ap	27○	·39	1	My	26	·92	3	Je	25	·45	4	Jl	24	·98
3514	470	335	17M	·8495	0·8749	3 544	**413**	3 4	Mr Ap	18 16○	·22 ·75	6	My	16	28	7	Je	14	·82	2	Jl	14	·35	3	Au	12	·88
3515	471	336	18M	1083	19·0138	1·678	**414**	2	Ap	6●	·12	3	My	5	·65	5	Je	4	·18	6	Jl	3	71	1	Au	2	24
3516	472	337	18M	3670	8·1221	25·390	**415**	6	Mr	26	·49	1	Ap	25	·02	2	My	24	·55	4	Je	23	·08	5 7	Jl Au	22 21○	·61 ·14
3517	473	338	17M	·6258	26·7610	23·523	**416**	5	Ap	13	·39	6	My	12	·92	1	Je	11	·45	2	Jl	10	·98	4	Au	9○	·51
3518	474	339	17M	·8845	15 8693	19·680	**417**	2	Ap	2	·75	4	My	2	·28	5	My	31	·81	7	Je	30	·84	1	Jl	29	·88
3519	475	340	18M	1438	4 9776	15·887	**418**	7	Mr	23	·12	1	Ap	21	·65	3 4	My Je	21 19	·18 ·71	6	Jl	19●	·24	7	Au	17	·77
3520	476	341	18M	·4021	23 6164	18·971	**419**	6	Ap	11	·02	7	My	10	·55	2	Je	9○	·08	3	Jl	8	·61	5	Au	7	·14
3521	477	342	17M	·6608	12·7247	10·128	**420**	3	Mr	30	·88	4	Ap	28	·92	6	My	28○	·45	7	Je	26	·98	2	Jl	26	·51
3522	478	343	17M	·9196	1·8330	6·285	**421**	7	Mr	19	·75	2 3	Ap My	18 17	·28 ·81	5	Je	16	·34	6	Jl	15	·87	1	Au	14	·40
3523	479	344	18M	·1788	20·4719	4·418	**422**	6	Ap	7○	·65	1	My	7	·18	2	Je	5	·71	4	Jl	5	·24	5	Au	3	·77
3524	480	345	18M	·4371	9·5802	0·576	**.423**	4	Mr	28○	·02	5	Ap	26	·55	7	My	26	·08	1	Je	24	·61	3	Jl	24	·14
3525	481	346	17M	·6958	28·2191	26·263	**424**	2	Ap	14	·91	4	My	14	·44	5	Je	12	·98	7	Jl	12	·51	2	Au	11	·04
3526	482	347	17M	·9546	17·3274	22·421	**425**	7	Ap	4	·28	1	My	3	·81	3	Je	2	·34	4	Jl	1	·87	6	Jl	31	·40
3527	483	348	18M	·2134	6·4857	18·578	**426**	4	Mr	24	·65	6	Ap	23	·18	7	My	22	·74	2 3	Je Jl	21 20○	·24 ·77	5	Au	19●	·30
3528	484	349	18M	·4721	25·0746	16·711	**427**	3	Ap	12	·55	5	My	12	·08	6	Je	10	·61	1	Jl	10●○	·14	2	Au	8	·67

* Ending moments of tithis are the same by Ārya siddhānta

from 1 B.C. to A.D. 500 (Sūrya siddhānta)*—*cont.*

Āśvina				Kārttika				Mārgaśirsha				Pausha				A.D.	Māgha				A.D.	Phālguna				Chaitra			
Week-day.	Month	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day	Month	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
7	S	12	·08	1	O	11○	·56	3	N	10●	·09	4	D	9	·62	**76**	6	Jr	8	15		7	F	6	68	2	Mr	7	21
4	Au	31	·40	5	S	29○	·93	7	O	29	·46	1	N	27	·99		3	D	27	·52	**77**	5	Jr	26	05	6	F	24	58
3	S	19○	·80	4	O	18	·83	6	N	17	·36	7	D	16	·89	**78**	2	Jr	15	·42		3	F	18	95	5	Mr	15	·48
7	S	8●	·66	2	O	8	·19	3	N	6	·72	5	D	6	·25	**79**	6	Jr	4	·70		1	F	8○	32	2	Mr	4	85
5	Au	29●	·03	6	S	27	·56	1	O	27	·09	2	N	25	·62		4	D	25	·15	**80**	5	Jr	28●○	68	7	F	22	21
3	S	15	93	5	O	15	·46	6	N	13	·99	1	D	13	·52	**81**	3	Jr	12●○	05		4	F	10	·58	6	Mr	12	11
1	S	5	29	2	O	4	·83	4	N	3	·36	5	D	2	·89	**82**	7	Jr	1●	·42		1	Jr	30	·95	8	Mr	1	48
5	Au	25	·66	7	S	24	·19	1	O	23	·72	3	N	22○	·25		4	D	21	·78	**83**	6	Jr	20	·31	7	F	18	85
4	S	13	·56	6	O	13	·09	7	N	11●○	·62	2	D	11	·15	**84**	8	Jr	9	·68		5	F	8	·21	6	Mr	8	74
1	S	1	·93	3	O	1	·46	4	O	80○	·99	6	N	29	·52		1	D	29	05	**85**	2	Jr	27	58	4	F	26	11
6	Au	22	29	7	S	20	·82	2	O	20	·35	8	N	18	·89		5	D	18	·42	**86**	6 1	Jr F	16 15	85 48	3	Mr	17○	·01
5	S	10○	·19	6	O	9	·72	1	N	8	·25	2	D	7	78	**87**	4	Jr	6	·81		5	F	4	84	7	Mr	6●○	37
2	Au	80○	·56	4	S	29	·09	5	O	28	·62	7	N	27	·15		1	D	26	·68	**88**	8	Jr	25	21	4	F	23	·74
1	S	17	·46	2	O	16	·99	4	N	15	·52	6	D	15	·05	**89**	7	Jr	13	·58		2	F	12	11	3	Mr	13	64
5	S	6	·82	7	O	6	·85	1	N	4	·88	3	D	4	·41	**90**	4	Jr	2○	95		6	F	1	·48	1	Mr	3	01
3	Au	27	·19	4	S	25	·72	6	O	25	·25	7	N	23	·78		2	D	23○	·31	**91**	3	Jr	21	·84	5	F	20	·87
2	S	15	·08	8	O	14	·62	5	N	13	·15	6	D	12○	·68	**92**	1	Jr	11	·21		2	F	9	74	4	Mr	10	·27
6	S	3	·45	7	O	2	·99	2	N	1	·52	4	D	1	·05		5	D	30	·58	**93**	7	Jr	29	11	1	F	27	·64
3	Au	28	·82	5	S	22	·85	6	O	21○	·88	1	N	20●	·41		2	D	19	·94	**94**	4	Jr	18	·47	6	F	17	·01
2	S	11	·72	4	O	11○	25	5	N	9	78	7	D	9	·31	**95**	1	Jr	7	84		3	F	6	·37	4	Mr	7	·90
7	S	1	·09	1	S	80○	62	3	O	80	·15	4	N	28	68		6	D	28	·21	**96**	7	Jr	26	·74	2	F	25	·27
5	S	18	·98	7	O	18	·51	2	N	17	·05	3	D	16	·58	**97**	5	Jr	15	·11		6	F	13○	·64	1	Mr	15	·17
3	S	8	·85	4	O	7	·88	6	N	6	·41	7	D	5	94	**98**	2	Jr	4	·47		4	F	8○	·00	5	Mr	4	·58
7	Au	28	·72	2	S	27	·25	8	O	26	78	5	N	25	·31		6	D	24	84	**99**	1	Jr	23○	·87	2	F	21	·90
6	S	16	·62	1	O	16	·15	2	N	14	·68	4	D	14	·21	**400**	5	Jr	12	·74		7	F	11	·27	1	Mr	11	·80
3	S	4	·98	5	O	4	·51	7	N	8	·04	1	D	2○	·57	**01**	3	Jr	1	11		4	Jr	30	·64	6	Mr	1	·17
1	Au	25	·35	2	S	28	·88	4	O	28	·41	5	N	21○	94		7	D	21	·47	**02**	2	Jr	20	·00	3	F	18	·53
7	S	13	·25	1	O	12	·78	3	N	11●○	31	4	D	10	84	**03**	6	Jr	9	·37		7	F	7	·90	2	Mr	9	·48
4	S	2	·61	6	O	2	·15	7	O	31	68	2	N	30	21		8	D	29	·74	**04**	5	Jr	28	·27	6	F	26	80
1	Au	21	·98	3 5	S O	20○ 20	·51 ·04	**Mārgasira Kshaya**				6	N	18	·57		1	D	18	·10	**05**	2 4	Jr F	16 15	·63 ·17	5	Mr	16○	·70
7	S	9○	·88	2	O	9	·41	8	N	7	·94	5	D	7	47	**06**	7	Jr	6	·00		1	F	4	53	3	Mr	6○	·06
5	Au	30○	·25	6	S	28	·78	1	O	28	·81	2	N	26	84		4	D	26	·87	**07**	5	Jr	24	·90	7	F	23●	·48
4	S	18	·14	5	O	17	·67	7	N	16	·21	1	D	15	74	**08**	8	Jr	14○	·27		4	F	12●	·80	6	Mr	18	·88
1	S	6	51	3	O	6	·04	4	N	4	·57	6	D	4	10	**09**	7	Jr	2○	·68		2	F	1	·16	3	Mr	2	·69
5	Au	26	·88	7	S	25	41	1	O	24	·94	3	N	23	47		5	D	23○	·00	**10**	6	Jr	21	·53	1	F	20	·06
4	S	14	·78	6	O	14	·31	7	N	12	·84	2	D	12●	37	**11**	8	Jr	10	·90		5	F	9	·43	6	Mr	10	·96
2	S	4	·14	3	O	8	·67	5	N	2○	·20	6	D	1	·73		1	D	81	27	**12**	2	Jr	29	·80	4	F	28	·88
6	Au	23	·51	1	S	22	·04	2	O	21○	·57	4	N	20	10		5	D	19	·68	**13**	7	Jr	18	·16	1	F	16	69
5	S	11	·41	6	O	10●○	·94	1	N	9	·47	8	D	9	·00	**14**	4	Jr	7	·53		6	F	6	06	7	Mr	7	·59
2	Au	31	·77	4	S	30●	·80	5	O	29	84	7	N	28	·37		1	D	27	·90	**15**	3	Jr	26	·43	4	F	24○	·96
1	S	19●	·67	8	O	19	·20	4	N	17	·78	6	D	17	·26	**16**	7	Jr	15	·79		2	F	14○	82	8	Mr	14	·86
6	S	8	·04	7	O	7	·57	2	N	6	·10	8	D	5	·63	**17**	5	Jr	4	16		6	F	2○	·69	1	Mr	4	·22
3	Au	28	·41	4	S	26	·94	6	O	26	·47	1	N	25	·00		2	D	24	58	**18**	4	Jr	23	·06	5	F	21	·59
2	S	16	·80	8	O	15	·88	5	N	14	·36	6	D	13○	·90	**19**	1	Jr	12	·43		2	F	10	96	4	Mr	12	·49
6	S	5	·67	1	O	5	·20	2	N	8	·78	4	D	3●○	26	**20**	5	Jr	1	·79		7	Jr	31	·32	1	F	29	·85
4	Au	25	·04	5	S	28	·57	7	O	28	·10	1	N	21○	·63		8	D	21	·16	**21**	4	Jr	19	·69	6	F	18	·22
2	S	12	·94	4	O	12	·47	6	N	11●	·00	7	D	10	·58	**22**	2	Jr	9	·06		8	F	7	·59	5	Mr	9	·12
7	S	2	·30	1	O	1○	·83	2	O	31	·86	4	N	29	·89		6	D	29	·42	**23**	7	Jr	27	·96	2	F	26	·49
4 6	Au S	22 21○	·67 ·20	7	O	20	·78	2	N	19	·26	**Pausha Kshaya**					3	D	18	·79	**24**	5	Jr	17	·32	6 1	F Mr	15 16○	·85 38
3	S	9○	·57	5	O	9	·10	6	N	7	·63	1	D	7	·16	**25**	2	Jr	5	·69		4	F	4	22	5	Mr	5●	·75
7	Au	29●	·93	2	S	28	·46	4	O	28	·00	5	N	26	·58		7	D	26	·06	**26**	1	Jr	24○	·59	3	F	28	·12
6	S	17	·83	1	O	17	·86	2	N	15	·89	4	D	15	·42	**27**	5	Jr	18○	·95		7	F	12	·48	2	Mr	14	·02
4	S	7	·20	5	O	6	·78	7	N	5	26	1	D	4	·79	**28**	3	Jr	8○	·32		4	F	1	·85	6	Mr	2	·88

To mean ending moment of tithis add algebraically — ·02 for Brahma siddhānta.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year.		First new moon in solar year	Anomaly of first new moon.	Christian era.	Vaiśākha.				Jyeshṭha.				Āshāḍha.				Śrāvaṇa.				Bhādrapada.			
			Month and day A.D.	Fraction of day.				Week-day.	Month.	Day.	Fraction.	Week-day.	Month	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
							A.D.																				
3529	485	350	17M	·7809	14·1829	12·868	**428**	7	Mr	31	·91	2	Ap	30	·44	3	My	29	·97	5	Je	28○	·50	7	Jl	28	·04
3530	486	351	17M	·9896	8·2912	9·026	**429**	5	Mr	21	·28	6 1	Ap My	19 19○	·81 ·84	2	Je	17	·87	4	Jl	17	·40	5	Au	15	·93
3531	487	352	18M	·2484	21·9301	7·159	**430**	4	Ap	9	·18	5	My	8○	·71	7	Je	7	·24	1	Jl	6	·77	3	Au	5	·80
3532	488	353	18M	·5071	11·0384	3·316	**431**	1	Mr	29	·54	3	Ap	28○	·08	4	My	27	·61	6	Je	26	·14	7	Jl	25	·67
3533	489	354	17M	7659	0.1467	27·028	**432**	5 7	Mr Ap	17 16●	·91 ·44	1	My	15	·97	3	Je	14	·50	5	Jl	14	·03	6	Au	12	·56
3534	490	355	18M	·0246	18·7859	25·161	**433**	4	Ap	5	·81	6	My	5	·34	7	Je	3	·87	2	Jl	3	·40	3	Au	1	·93
3535	491	356	18M	·2834	7·8939	21·319	**434**	2	Mr	26	·18	3	Ap	24	71	5	My	24	·24	6	Je	22	·77	1 2	Jl Au	22 20○	·30 83
3536	492	357	18M	·5422	26·5328	19·452	**435**	1	Ap	14	·07	2	My	13	60	4	Je	12	14	5	Jl	11	·67	7	Au	10●○	·20
3537	493	358	17M	·8009	15·6411	15·609	**436**	5	Ap	2	·44	6	My	1	·97	1	My	31	·50	3	Je	30	·08	4	Jl	29	56
3538	494	359	18M	0597	4·7494	11·766	**437**	2	Mr	22	·81	4	Ap	21	·34	5 7	My Je	20 19○	·87 ·40	1	Jl	18	·93	3	Au	17	·42
3539	495	360	18M	·3184	23·3882	9·900	**438**	1	Ap	10	.71	3	My	10	·24	4	Je	8○	77	6	Jl	8	·30	7	Au	6	·88
3540	496	361	18M	5772	12·4965	6·057	**439**	6	Mr	31	·07	7	Ap	29	·60	2	My	29	·13	3	Je	27	·66	5	Jl	27	·20
3541	497	362	17M	·8359	1·6048	2·214	**440**	3	Mr	19	·44	4 6	Ap My	17○ 17●	·97 ·50	1	Je	16	·03	2	Jl	15	·56	4	Au	14	·09
3542	498	363	18M	·0947	20·2437	0·347	**441**	2	Ap	7○	34	3	My	6	·87	5	Je	5	·40	6	Jl	4	·93	1	Au	3	46
3543	499	364	18M	·3535	9·3520	24·059	**442**	6	Mr	27○	·70	1	Ap	26	·24	2	My	25	·77	4	Je	24	30	5 7	Jl Au	23 22	88 ·36
3544	500	365	18M	·6122	27·9909	22·192	**443**	5	Ap	15	·60	7	My	15	·13	1	Je	13	·66	3	Jl	13	·19	4	Au	11	·72
3545	501	366	17M	·8710	17·0992	18·350	**444**	2	Ap	3	·97	4	My	3	·50	6	Je	2	03	7	Jl	1	·56	2	Jl	31○	·09
3546	502	367	18M	1297	6·2075	14·507	**445**	7	Mr	24	34	1	Ap	22	·87	3	My	22	·40	4 6	Je Jl	20 20○	93 ·46	7	Au	18	·99
3547	503	368	18M	·3885	24·8464	12·640	**446**	6	Ap	12	23	7	My	11	·76	2	Je	10	·30	3	Jl	9●○	·83	5	Au	8	·36
3548	504	369	18M	·6472	13·9547	8·797	**447**	3	Ap	1	·60	5	My	1	13	6	My	30○	·66	1	Je	29●	19	2	Jl	28	·72
3549	505	370	17M	·9060	3·0630	4·955	**448**	7	Mr	20	·97	2 4	Ap My	19 19○	50 08	5	Je	17	56	7	Jl	17	09	1	Au	15	·62
3550	506	371	18M	·1648	21·7018	3·088	**449**	6	Ap	8	·87	1	My	8●○	40	2	Je	6	93	4	Jl	6	·46	5	Au	4	99
3551	507	372	18M	4235	10·8102	26·800	**450**	4	Mr	29	28	5	Ap	27	·76	7	My	27	·29	1	Je	25	·82	3	Jl	25	·36
3552	508	373	18M	·6823	29·4491	24·933	**451**	1 3	Mr Ap	18○ 17	·60 ·12	4	My	16	·66	6	Je	15	·19	7	Jl	14	·72	2	Au	13	25
3553	509	374	17M	·9410	18·5574	21·090	**452**	7	Ap	5	·50	2	My	5	·03	3	Je	3	·56	5	Jl	3	·09	6	Au	1	·62
3554	510	375	18M	·1998	7·6657	17·248	**453**	4	Mr	25	86	6	Ap	24	·40	7	My	23	93	2	Je	22	·46	3 5	Jl Au	21 20○	·99 ·52
3555	511	376	18M	·4585	26·3046	14·381	**454**	3	Ap	13	·76	5	My	13	29	6	Je	11	·82	1	Jl	11	·35	2	Au	9●	·88
3556	512	377	18M	·7173	15·4128	11·538	**455**	1	Ap	3	·13	2	My	2	·66	4	Je	1	·19	5	Je	30○	72	7	Jl	30●	·25
3557	513	378	17M	·9760	4·5211	7·695	**456**	5	Mr	22	50	7	Ap	21	·03	1 3	My Je	20 19○	·56 ·09	4	Jl	18	·62	6	Au	17	15
3558	514	379	18M	·2348	23·1600	5·829	**457**	4	Ap	10	·39	5	My	9	·92	7	Je	8●	·46	1	Jl	7	·99	3	Au	6	52
3559	515	380	18M	·4936	12·2683	1·986	**458**	1	Mr	30	76	3	Ap	29○	·29	4	My	28●	·82	6	Je	27	·35	7	Jl	26	·88
3560	516	381	18M	·7523	1·3766	25·698	**459**	6	Mr	20	·13	7 2	Ap My	18○ 18●	·66 ·19	3	Je	16	·72	5	Jl	16	·25	6	Au	14	·78
3561	517	382	18M	·0111	20·0155	23·831	**460**	5	Ap	7●○	·03	6	My	6	·56	1	Je	5	09	2	Jl	4	62	4	Au	3	·15
3562	518	383	18M	·2698	9·1238	19·988	**461**	2	Mr	27●	·39	3	Ap	25	92	5	My	25	45	6	Je	23	·98	1 3	Jl Au	23 22	52 05
3563	519	384	18M	·5286	27·7627	18·121	**462**	1	Ap	15	·29	2	My	14	·82	4	Je	13	35	5	Jl	12	·88	7	Au	11○	41
3564	520	385	18M	7873	16·8710	14·279	**463**	5	Ap	4	·66	7	My	4	·19	1	Je	2	72	3	Jl	2	·25	4	Jl	31○	78
3565	521	386	18M	·0461	5·9793	10·436	**464**	3	Mr	24	·02	4	Ap	22	·56	6	My	22	·09	7 2	Je Jl	20 20●○	·62 ·15	3	Au	18	·68
3566	522	387	18M	3049	24·6182	8·569	**465**	1	Ap	11	·92	3	My	11	·45	4	Je	9○	·98	6	Jl	9○	51	1	Au	8	·04
3567	523	388	18M	·5636	13·7242	4·726	**466**	6	Ap	1	·29	7	Ap	30	·82	2	My	30○	35	3	Je	28	·88	5	Jl	28	41
3568	524	389	18M	8224	2·8347	0·884	**467**	3	Mr	21	·66	5 6	Ap My	20 19●○	19 ·72	1	Je	18	·25	2	Jl	17	·78	4	Au	16	·31
3569	525	390	18M	·0811	21·4737	26·571	**468**	2	Ap	8	55	4	My	8●	·08	5	Je	6	·62	7	Jl	6	·15	1	Au	4	·68
3570	526	391	18M	·3399	10·5826	22·729	**469**	6	Mr	28○	·92	1	Ap	27	·45	2	My	26	·98	4	Je	25	·51	6	Jl	25	·04
3571	527	392	18M	5986	29·2209	20·862	**470**	4 5	Mr Ap	18○ 16	·29 ·82	7	My	16	·35	1	Je	14	88	3	Jl	14	·41	4	Au	12	·94
3572	528	393	18M	·8574	18·3292	17·019	**471**	3	Ap	6	·19	4	My	5	72	6	Je	4	25	7	Jl	3	·78	2	Au	2	·31
3573	529	394	18M	·1162	7·4375	13·176	**472**	7	Mr	25	·55	2	Ap	24	·08	3	My	23	·61	5	Je	22	14	6 1	Jl Au	21 20●	·68 ·21
3574	530	395	18M	3749	26·0763	11·310	**473**	6	Ap	13	·45	7	My	12	·98	2	Je	11	·51	4	Jl	11○	·04	5	Au	9	·57
3575	531	396	18M	·6337	15·1846	7·467	**474**	3	Ap	2	·82	5	My	2	·35	6	My	31	·88	1	Je	30○	·41	2	Jl	29	·94
3576	532	397	18M	8924	4·2929	3·624	**475**	1	Mr	23	·18	2	Ap	21	72	4 5	My Je	21 19●○	·25 ·78	7	Jl	19	·31	1	Au	17	·84
3577	533	398	18M	1512	22·9318	1·757	**476**	7	Ap	10	·08	1	My	9○	·61	3	Je	8	·14	4	Jl	7	·67	6	Au	6	·20
3578	534	399	18M	·4099*	12·0401	25·469	**477**	4	Mr	30	·45	5	Ap	28○	98	7	My	28	·51	2	Je	27	·04	3	Jl	26	·57
3579	535	400	18M	·6687	1·1484	21·627	**478**	1	Mr	19	·82	3 4	Ap My	18○ 17	·35 ·88	6	Je	16	·41	7	Jl	15	·94	2	Au	14	·47
3580	536	401	18M	9274	19·7878	19·760	**479**	7	Ap	7●	·71	2	My	7	·24	3	Je	5	·78	5	Jl	5	·31	6	Au	3	·84
3581	537	402	18M	·1862	8·8956	15·917	**480**	5	Mr	27	·08	6	Ap	25	61	1	My	25	·14	2	Je	23	·67	4	Jl	23	·20

* The ending moments of tithis are the same by Ārya siddhānta.

from 1 B.C. to A.D. 500 (Sūrya siddhânta)*—*cont.*

Āśvina. Week-day.	Month.	Day.	Fraction.	Kārttika. Week-day.	Month.	Day.	Fraction.	Mārgaśīrsha. Week-day.	Month.	Day.	Fraction.	Pausha. Week-day.	Month.	Day.	Fraction.	A.D.	Māgha. Week-day.	Month.	Day.	Fraction.	A.D.	Phālguna. Week-day.	Month.	Day.	Fraction.	Chaitra. Week-day.	Month.	Day.	Fraction.
1	Au	26	·57	8	S	25	·10	4	O	24	·68	6	N	23	·16		7	D	22	·69	**29**	2	Jr	21	·22	3	F	19	·75
7	S	14	·46	1	O	18	·99	8	N	12○	52	5	D	12●	06	**30**	6	Jr	10	·59		1	F	9	·12	2	Mr	10	·65
4	S	8	·88	6	O	8	·36	7	N	1○	·89	2	D	1	42		8	D	30	·95	**31**	5	Jr	29	·48	7	F	28	·01
2	Au	24	·20	3	S	22	·73	5	O	22○	26	6	N	20	·79		1	D	20	·32	**32**	2	Jr	18	·85	4	F	17	·38
1	S	11	·10	2	O	10●	·68	4	N	9	16	5	D	8	69	**33**	7	Jr	7	·22		1	F	5	·75	3	Mr	7○	·28
5	Au	31○	·46	6	S	29●	·99	1	O	29	52	8	N	28	·05		4	D	27	58	**34**	6	Jr	26	12	7	F	24●○	65
4	S	19	·86	5	O	18	89	7	N	17	42	1	D	16	·95	**35**	3	Jr	15	·48		5	F	14●○	·01	6	Mr	15	54
1	S	8	·73	8	O	8	·26	4	N	6	79	6	D	6	·82	**36**	7	Jr	4	85		2	F	3●	·38	3	Mr	8	·91
6	Au	28	·09	7	S	26	·62	2	O	26	16	8	N	24	·69		5	D	24○	·22	**37**	6	Jr	22	·75	1	F	21	·28
4	S	15	·99	6	O	15	·52	1	N	14	05	2	D	13○	·58	**38**	4	Jr	12	·11		5	F	10	·64	7	Mr	12	·18
2	S	5	·86	3	O	4	·89	5	N	3	·42	6	D	2●○	95	**39**	1	Jr	1	48		3	Jr	31	·01	4	Mr	1	·54
6	Au	25	·73	1	S	24	·26	2	O	23	·79	4	N	22	·32		5	D	21	·85	**40**	7	Jr	20	88	1	F	18	·91
5	S	12	62	7	O	12○	·15	1	N	10	·68	8	D	10	22	**41**	4	Jr	8	·75		6	F	7	·28	7	Mr	8	·81
2	S	1	·99	4	O	1○	·52	6	O	31	·05	7	N	29	·58		2	D	29	·11	**42**	3	Jr	27	·64	5	F	26	·17
1	S	20●○	·89	3	O	20	42	4	N	18	·95	6	D	18	48	**43**	1	Jr	17	01		2	F	15	·54	4	Mr	17	·07
6	S	10	·26	7	O	9	·79	2	N	8	·82	3	D	7	·85	**44**	5	Jr	6	·38		6	F	4○	·91	1	Mr	5	44
3	Au	29	·62	5	S	28	·15	6	O	27	68	1	N	26	·21		2	D	25	·74	**45**	4	Jr	24○	·28	5	F	22	·81
2	S	17	·52	4	O	17	·05	5	N	15	·58	7	D	15	·11	**46**	1	Jr	13●○	·64		3	F	12	17	4	Mr	18	·70
6	S	6	·89	1	O	6	·42	2	N	4	95	4	D	4	·48	**47**	6	Jr	3	·01		7	F	1	54	2	Mr	8	·07
4	Au	27	·25	5	S	25	·78	7	O	25	·82	1	N	23○	·85		3	D	23	38	**48**	4	Jr	21	·91	6	F	20	·44
3	S	14	·15	4	O	13	·68	6	N	12○	·21	7	D	11	·74	**49**	2	Jr	10	27		3	F	8	·80	5	Mr	10	·84
7	S	3	·52	2	O	8	·05	8	N	1○	·58	5	D	1	11		6	D	30	·64	**50**	1	Jr	29	·17	2	F	27	·70
4	Au	23	·89	6	S	22	·42	7	O	21	·95	2	N	20	·48		4	D	20	·01	**51**	5	Jr	18	·54	7	F	17	·07
3	S	11○	·78	5	O	11	·31	6	N	9	·84	1	D	9	·38	**52**	2	Jr	7	·91		4	F	6	·44	5	Mr	6○	·97
1	Au	31○	·15	2	S	29	·68	4	O	29	·21	5	N	27	74		7	D	27	27	**53**	1	Jr	25	·80	3	F	24○	·38
7	S	19	·05	1	O	18	·58	8	N	17	11	4	D	16	64	**54**	6	Jr	15	·17		7	F	13	·70	2	Mr	15	·28
4	S	8	·42	5	O	7	·95	7	N	6	48	2	D	6	01	**55**	3	Jr	4○	54		5	F	3	·07	6	Mr	4	·60
1	Au	28	78	3	S	27	·81	4	O	26	·84	6	N	25	87		7	D	24○	·90	**56**	2	Jr	28	·44	3	F	21	·97
7	S	15	·68	2	O	15	·21	3	N	13	74	5	D	13○	27	**57**	6	Jr	11	80		1	F	10	·33	2	Mr	11	·86
5	S	5	05	6	O	4	·58	1	N	3	·11	2	D	2●	64	**58**	4	Jr	1	·17		5	Jr	30	·70	7	Mr	1	·28
2	Au	25	41	8	S	23	·94	5	O	23○	48	7	N	22	01		1	D	21	54	**59**	3	Jr	20	·07	4	F	18	·60
1	S	13	31	2	O	12●○	·84	4	N	11	37	5	D	10	·90	**60**	7	Jr	9	43		1	F	7	96	3	Mr	8	·50
5	S	1	·68	7	O	1○	·21	1	O	30	74	3	N	29	·27		4	D	28	·80	**61**	6	Jr	27	·33	7	F	25	·86
4	S	20●	·58	6	O	20	·11	7	N	18	64	2	D	18	·17	**62**	3	Jr	16	·70		5	F	15○	·23	6	Mr	16●	76
1	S	9	·94	3	O	9	·47	5	N	8	·00	6	D	7	·54	**63**	1	Jr	6	·07		2	F	4○	·60	4	Mr	6	·13
6	Au	30	·31	7	S	28	·84	2	O	28	·37	3	N	26	·90		5	D	26	·43	**64**	6	Jr	24○	·96	1	F	23	·49
5	S	17	·21	6	O	16	·74	1	N	15	·27	2	D	14	·80	**65**	4	Jr	13●	·33		5	F	11	·86	7	Mr	18	·89
2	S	6	58	4	O	6	·11	5	N	4	·64	7	D	4○	·17	**66**	1	Jr	2	·70		3	F	1	·23	4	Mr	2	·76
6	Au	26	·94	1	S	25	47	3	O	25	00	4	N	23○	·53		6	D	23	·06	**67**	7	Jr	21	·60	2	F	20	·13
5	S	14	·84	7	O	14	·37	1	N	12●○	·90	8	D	12	·43	**68**	4	Jr	10	·96		6	F	9	·49	1	Mr	10	·02
3	S	3	·21	4	O	2	·74	6	N	1●	·27	7	N	30	80		2	D	30	·33	**69**	3	Jr	28	·86	5	F	27	·31
7	Au	23	·57	2	S	22○	·10	8	O	21●	64	5	N	20	·17		6	D	19	·70	**70**	1	Jr	18	23	2	F	16	·76
6	S	11○	·47	1	O	11	·00	2	N	9	·53	4	D	9	·06	**71**	5	Jr	7	·59		7	F	6	·12	1	Mr	7○	66
3	Au	31○	·84	5	S	30	·87	6	O	29	90	1	N	28	·43		2	D	27	·96	**72**	4	Jr	26	49	6	F	25	·02
2	S	18	·74	4	O	18	·27	5	N	16	·80	7	D	16	·88	**73**	1	Jr	14○	·86		3	F	13	·39	4	Mr	14	·92
7	S	8	·10	1	O	7	·68	8	N	6	·16	4	D	5	·70	**74**	6	Jr	4●○	·23		7	F	2	·76	2	Mr	4	·29
4	Au	28	·47	6	S	27	·00	7	O	26	·58	2	N	25	·06		8	D	24○	59	**75**	5	Jr	28	12	6	F	21	·65
3	S	16	·87	4	O	15	·90	6	N	14	·43	7	D	18●	·96	**76**	2	Jr	12	49		4	F	11	02	5	Mr	11	·55
7	S	4	·74	2	O	4	·27	8	N	2○	80	5	D	2	·33		6	D	31	·86	**77**	1	Jr	30	39	2	F	28	·92
5	Au	25	·10	6	S	23	·68	1	O	28○	·16	2	N	21	·69		4	D	21	·22	**78**	5	Jr	19	·76	7	F	18	·29
4	S	13	·00	5	O	12○	·58	7	N	11	·06	1	D	10	59	**79**	8	Jr	9	·12		4	F	7	·65	6	Mr	9	18
1	S	2	·87	2	O	1●	·90	4	O	31	·43	5	N	29	·96		7	D	29	49	**80**	2	Jr	28	·02	3	F	26○	·55
{5 {7	Au S	21○ 20●	·73 ·26	1	O	19	·80	8	N	18	·38	4	D	17	·86	**81**	6	Jr	16	39		7	F	14○	·92	2	Mr	16	·45

To mean ending moment of tithis, add algebraically ·02 for Brahma siddhânta.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era.	Vaiśākha. Week-day.	Month.	Day.	Fraction.	Jyeshṭha. Week-day.	Month.	Day.	Fraction.	Āshāḍha.* Week-day.	Month.	Day.	Fraction.	Śrāvaṇa. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day.	Month.	Day.	Fraction.
							A.D																				
3582	538	403	18M	·4450	27·5345	14·050	**481**	3	Ap	14	·98	5	My	14	·51	7	Je	13	·04	1	Jl	12	·57	3	Au	11●○	·10
3583	539	404	18M	·7037	16·6428	10·208	**482**	1	Ap	4	·35	2	My	3	·88	4	Je	2	·41	5	Jl	1	·94	7	Jl	31○	·47
3584	540	405	18M	·9625	5·7511	6·365	**483**	5	Mr	24	·71	7	Ap	23	·24	1	My	22	·77	3 4	Je Jl	21○ 20	·30 ·84	6	Au	19	·37
3585	541	406	18M	2212	24·3900	4·498	**484**	4	Ap	11	·61	5	My	11	14	7	Je	9○	·67	2	Jl	9	·20	3	Au	7	·73
3586	542	407	18M	·4800	13·4983	0·655	**485**	1	Mr	31	·98	3	Ap	30	·51	5	My	30○	·04	6	Je	28	·57	1	Jl	28	·10
3587	543	408	18M	·7887	2·6061	24·367	**486**	6	Mr	21	·34	7 2	Ap My	19 19●	·88 ·41	3	Je	17	·94	5	Jl	17	·47	7	Au	16	·00
3588	544	409	18M	·9975	21·2455	22·500	**487**	5	Ap	9○	·24	6	My	8●	77	1	Je	7	·30	2	Jl	6	·83	4	Au	5	·36
3589	545	410	18M	·2563	10·3538	18·658	**488**	2	Mr	28●○	·61	4	Ap	27	·14	5	My	26	·67	7	Je	25	·20	1	Jl	24	·73
3590	546	411	18M	·5150	28·9927	16·791	**489**	1	Ap	16	·51	3	My	16	·04	4	Je	14	·57	6	Jl	14	·10	7	Au	12	·63
3591	547	412	18M	·7738	18·1010	12·948	**490**	5	Ap	5	·87	7	My	5	·40	1	Je	3	·94	3	Jl	3	·47	5	Au	2	·00
3592	548	413	19M	·0325	7·2092	9·105	**491**	3	Mr	26	·24	4	Ap	24	77	6	My	24	·80	7	Je	22	·83	2 3	Jl Au	22○ 20●	·36 ·89
3593	549	414	18M	·2913	25·8481	7·239	**492**	2	Ap	13	·14	3	My	12	·67	5	Je	11	·20	6	Jl	10○	·73	1	Au	9	·26
3594	550	415	18M	·5500	14·9564	3·396	**493**	6	Ap	2	·51	1	My	2	04	2	My	31	·57	4	Je	30○	·10	5	Jl	29	·63
3595	551	416	18M	8088	4·0647	27·108	**494**	3	Mr	22	·87	5	Ap	21	·40	6 1	My Je	20○ 19●	·98 ·46	3	Jl	19	·00	4	Au	17	·53
3596	552	417	19M	·0675	22·7036	25·241	**495**	2	Ap	10	·77	4	My	10○	30	5	Je	8	83	7	Jl	8	·36	1	Au	6	·89
3597	553	418	18M	·3263	11·8119	21·398	**496**	7	Mr	30	14	1	Ap	28○	·67	3	My	28	·20	4	Je	26	·73	6	Jl	26	·26
3598	554	419	18M	·5851	0·9202	17·556	**497**	4	Mr	19	·50	6 7	Ap My	18 17	·04 ·57	2	Je	16	·10	3	Jl	15	·63	5	Au	14	·11
3599	555	420	18M	·8438	19·5591	15·689	**498**	3	Ap	7	·40	4	My	6	·93	6	Je	5	·46	7	Jl	4	·99	2	Au	3	·52
3600	556	421	19M	·1026	8·6674	11·846	**499**	7	Mr	27	·77	2	Ap	26	30	3	My	25	·83	5	Je	25	·36	6	Jl	23	·89
																				ĀRYA SIDDHĀNTA							
3601	557	422	18M	·8611	27·28318	9·612	**500**	6	Ap	14	·65	1	My	14	18	2	Je	12	·71	4	Jl	12	·24	5	Au	10○	·77
3602	558	423	18M	·6198	16·39162	5·770	**501**	4	Ap	4	·02	5	My	3	54	7	Je	2	·08	1	Jl	1	61	3	Jl	31●	·40
3603	559	424	18M	8785	5·50004	1·928	**502**	1	Mr	24	·38	2	Ap	22	91	4 5	My Je	22 20○	·44 ·97	7	Jl	20●	·50	2	Au	19	·03
3604	560	425	19M	·1371	24·13907	0·062	**503**	7	Ap	12	·28	1	My	11	·81	3	Je	10●○	34	4	Jl	9	·87	6	Au	8	·40
3605	561	426	18M	·3958	13·24751	23·774	**504**	4	Mr	31	·65	6	Ap	30	18	7	My	29	·71	2	Je	28	·24	3	Jl	27	·77
3606	562	427	18M	·6545	2·35594	19·932	**505**	2	Mr	21	·01	3 5	Ap My	19○ 19●	54 07	5	Je	17	·61	1	Jl	17	·14	2	Au	15	·67
3607	563	428	18M	9132	20·99497	18·066	**506**	7	Ap	8○	·91	2	My	8	44	3	Je	6	·97	5	Jl	6	·50	7	Au	5	·03
3608	564	429	19M	·1719	10·10341	14·224	**507**	5	Mr	29○	·28	6	Ap	27	81	1	My	27	·34	2	Je	25	·87	4	Jl	25	·40
3609	565	430	18M	·4305	28·74242	12·357	**508**	4	Ap	16	·18	5	My	15	·71	7	Je	14	·24	1	Jl	13	·77	3	Au	12	·30
3610	566	431	18M	·6892	17·85086	8·515	**509**	1	Ap	5	·64	3	My	5	07	4	Je	3	·60	6	Jl	3	·13	7	Au	1○	·66
3611	567	432	18M	·9479	6·95930	4·673	**510**	5	Mr	25	·91	7	Ap	24	·44	1	My	23	·97	3 5	Je Jl	22 22○	·50 ·03	6	Au	20	·56
3612	568	433	19M	·2066	25·59832	2·806	**511**	4	Ap	13	·81	6	My	13	·34	7	Je	11	·87	2	Jl	11○	·40	3	Au	9	·93
3613	569	434	18M	·4653	14·70676	26·518	**512**	2	Ap	2	·17	3	My	1	·70	5	My	31○	·24	6	Je	29●	·77	1	Jl	29	·30
3614	570	435	18M	·7240	3·81519	22·677	**513**	6	Mr	22	·54	1	Ap	21	·07	2 4	My Je	20○ 19●	·60 ·14	5	Jl	18	·66	6	Au	17	·19
3615	571	436	18M	·9826	22·45421	20·810	**514**	5	Ap	10	·44	6	My	9●○	·97	1	Je	8	·50	3	Jl	8	·03	4	Au	6	·56
3616	572	437	19M	·2413	11·56265	16·968	**515**	2	Mr	30	·81	4	Ap	29	·34	5	My	28	·87	7	Je	27	·40	1	Jl	26	·93
3617	573	438	18M	·5000	0·67109	13·126	**516**	7 1	Mr Ap	19○ 17●	·17 ·70	3	My	17	·23	4	Je	15	·76	6	Jl	15	·30	7	Au	13	·83
3618	574	439	18M	·7587	19·31011	11·260	**517**	6	Ap	7●	·07	7	My	6	·60	2	Je	5	·13	3	Jl	4	·66	5	Au	3	·19
3619	575	440	19M	·0174	8·41855	7·417	**518**	3	Mr	27	·44	4	Ap	25	·97	6	My	25	·50	1	Je	24	·03	2 4	Jl Au	23 22●○	·56 ·09
3620	576	441	19M	·2760	27·05757	5·551	**519**	2	Ap	15	·34	3	My	14	·87	5	Je	13	·40	6	Jl	12	·93	1	Au	11●	·46
3621	577	442	18M	·5347	16·16600	1·709	**520**	6	Ap	3	·70	1	My	3	·23	2	Je	1	·76	4	Jl	1○	·29	5	Jl	30	·82
3622	578	443	18M	·7934	5·27444	25·421	**521**	4	Mr	24	·07	5	Ap	22	·60	7 1	My Je	22 20●○	·13 ·66	3	Jl	20	·19	4	Au	18	·72
3623	579	444	19M	·0521	23·91847	23·555	**522**	2	Ap	11	·97	4	My	11	·50	6	Je	10●	·03	7	Jl	9	·56	2	Au	8	·09
3624	580	445	19M	·3108	13·02189	19·713	**523**	7	Ap	1	·33	1	Ap	30○	·86	3	My	30	·40	4	Je	28	·93	6	Jl	28	·46
3625	581	446	18M	·5694	2·13033	15·870	**524**	4	Mr	20	·70	6 7	Ap My	19○ 18	·23 ·76	2	Je	17	·29	4	Jl	16	·82	5	Au	15	·35
3626	582	447	18M	·8281	20·76936	14·004	**525**	3	Ap	8○	·60	5	My	8	·13	6	Je	6	·66	1	Jl	6	·19	2	Au	4	·72
3627	583	448	19M	·0868	9·87779	10·162	**526**	7	Mr	28	·97	2	Ap	27	·50	4	My	27	·03	5	Je	25	·56	7	Jl	25	·09
3628	584	449	19M	·3455	28·51682	8·295	**527**	6	Ap	16	·86	1	My	16	·39	2	Je	14	·92	4	Jl	14	·46	5	Au	12○	·99
3629	585	450	18M	·6042	17·62526	4·453	**528**	4	Ap	5	·23	5	My	4	·76	7	Je	3	·29	1	Jl	2	·82	3	Au	1○	·35
3630	586	451	18M	·8628	6·73868	0·611	**529**	1	Mr	25	·60	3	Ap	24	·13	4	My	23	·66	6 7	Je Jl	22 21●○	·19 ·72	2	Au	20	·25
3631	587	452	19M	·1215	25·37271	26·299	**530**	7	Ap	13	·50	2	My	13	·03	3	Je	11	·56	5	Jl	11	·09	6	Au	9	·62
3632	588	453	19M	·3802	14·48115	22·457	**531**	4	Ap	2	·86	6	My	2	·39	7	My	31○	·92	2	Je	30●	·45	3	Jl	29	·98
3633	589	454	18M	·6389	3·58958	18·614	**532**	2	Mr	22	·23	3	Ap	20	76	5 6	My Je	20○ 18	·29 ·82	1	Jl	18	·35	2	Au	16	·88

* For Sūrya siddhānta figures for A.D. 500 to
Ending moments of tithis are the same for Ārya and Sūrya siddhāntas.

from 1 B.C. to A.D. 500 (Sūrya siddhānta)*—cont.

Āśvina. Week-day. Month Day	Fraction.	Kārttika. Week-day Month. Day.	Fraction.	Mārgaśīrsha. Week-day. Month. Day.	Fraction	Pausha. Week-day. Month. Day	Fraction	A.D.	Māgha. Week-day. Month Day.	Fraction.	A.D.	Phālguna. Week-day Month Day	Fraction.	Chaitra. Week-day. Month. Day	Fraction.
4 S 9	·63	6 O 9	·16	7 N 7	·69	3 D 7	·22	82	3 Jr 5	·75		5 F 4○	·28	6 Mr 5	·82
2 Au 30	·00	3 S 28	·53	5 O 28	·06	6 N 26	·59		1 D 26	·12	83	2 Jr 24	65	4 F 23	·18
7 S 17	·90	2 O 17	·43	3 N 15	·96	5 D 15○	·49	84	7 Jr 14●	·02		1 F 12	·55	3 Mr 13	·08
5 S 6	·26	6 O 5	·79	1 N 4	·32	2 D 3○	·86	85	4 Jr 2	·89		5 Jr 31	·92	7 Mr 2	·45
2 Au 26	·63	4 S 25	·16	5 O 24	·69	7 N 23●○	·22		1 D 22	·75	86	3 Jr 21	28	4 F 19	·81
1 S 14	·53	3 O 14	·06	4 N 12●	·59	6 D 12	12	87	7 Jr 10	·65		2 F 9	·18	3 Mr 10	·71
5 S 3	·90	7 O 3○	·43	1 N 1●	·96	3 D 1	·49		5 D 31	·02	88	6 Jr 29	55	1 F 28	·08
3 Au 23	·26	4 S 21○ 6 O 21	·79 ·32	7 N 19	·85	Pausha Kshaya			2 D 19	38	89	3 Jr 17	92	5 F 16 6 Mr 17●○	·45 ·98
2 S 11●○	·16	3 O 10	·69	5 N 9	·22	6 D 8	·75	90	1 Jr 7	28		2 F 5	·81	4 Mr 7●	·34
6 Au 31	·58	1 S 30	·06	2 O 29	·59	4 N 28	·12		5 D 27	65	91	7 Jr 26○	·18	1 F 24●	·71
5 S 19	·42	6 O 18	·96	1 N 17	·49	3 D 17	·02	92	4 Jr 15○	55		6 F 14	·08	7 Mr 14	·61
2 S 7	·79	4 O 7	·32	5 N 5	·85	7 D 5	·38	93	1 Jr 3●○	91		3 F 2	·44	4 Mr 3	·98
7 Au 28	·16	1 S 26	·69	3 O 26	·22	4 N 24	·75		6 D 24	·28	94	1 Jr 22	·81	2 F 21	·34
6 S 16	·06	7 O 15	·59	2 N 14○	·12	3 D 13	·65	95	5 Jr 12	18		6 F 10	·71	1 Mr 12	·24
3 S 5	·42	4 O 4	·95	6 N 3○	·48	1 D 3	·02	96	2 Jr 1	·55		4 Jr 31	·08	5 F 29	·61
7 Au 24	79	2 S 23	·32	3 O 22●○	·85	5 N 21	·38		6 D 20	91	97	1 Jr 19	·44	2 F 17	·97
6 S 12	·69	1 O 12	·22	2 N 10	·75	4 D 10	·28	98	5 Jr 8	·81		7 F 7	·34	1 Mr 8○	·87
4 S 2○	·06	5 O 1	·59	7 O 31	·12	1 N 29	·65		3 D 29	·18	99	4 Jr 27	·71	6 F 26○	·24
1 Au 22○ 2 S 20	·42 ·95	4 O 20	·48	6 N 19	·01	7 D 18	·54	500	2 Jr 17	06		3 F 15●○	·59	5 Mr 16	·12

FROM A.D. 500 TO A.D. 999.

Āśvina. Week-day. Month Day	Fraction.	Kārttika. Week-day Month. Day.	Fraction.	Mārgaśīrsha. Week-day. Month. Day.	Fraction	Pausha. Week-day. Month. Day	Fraction	A.D.	Māgha. Week-day. Month Day.	Fraction.	A.D.	Phālguna. Week-day Month Day	Fraction.	Chaitra. Week-day. Month. Day	Fraction.
7 S 9	·30	1 O 8	·83	3 N 7	·36	4 D 6	·89	01	6 Jr 5	·42		7 F 3	·95	2 Mr 5	·48
4 Au 29	·67	6 S 28	·20	7 O 27	·78	2 N 26	·26		3 D 25○	79	02	5 Jr 24	·82	6 F 22	·85
3 S 17	·56	5 O 17	·10	6 N 15	·63	1 D 15○	·16	03	2 Jr 18	·69		4 F 12	·22	5 Mr 18	·75
7 S 6	·93	2 O 6	·46	3 N 4	·99	5 D 4○	·52	04	7 Jr 3	·05		1 F 1	·58	3 Mr 2	·12
5 Au 26	·30	6 S 24	·83	1 O 24	·36	2 N 22	·89		4 D 22	·42	05	5 Jr 20	·95	7 F 19	·48
4 S 14	·20	5 O 13○	·73	7 N 12	·26	1 D 11	·79	06	3 Jr 10	·32		4 F 8	·79	6 Mr 10	·38
1 S 3	·56	3 O 3○	·09	4 N 1●	·62	6 D 1	·16		7 D 30	·69	07	2 Jr 29	·22	3 F 27	·75
5 Au 28	·93	7 S 22○ 2 O 21	·46 ·99	3 N 20	·52	5 D 20	05		Māgha Kshaya.		08	6 Jr 18 1 F 17	·58 ·10	2 Mr 17	·62
4 S 10●	·88	6 O 10	·36	7 N 8	·99	2 D 8	·42	09	3 Jr 6	95		5 F 5○	·48	7 Mr 7	·01
2 Au 31●	·20	3 S 29	·73	5 O 29	·26	6 N 27	·79		1 D 27	·32	10	2 Jr 25○	·85	4 F 24	·38
1 S 19	·09	2 O 18	·62	4 N 17	·15	5 D 16	68	11	7 Jr 15○	·22		1 F 13	·75	3 Mr 15	·28
5 S 8	·46	7 O 8	·09	1 N 6	·52	3 D 6	·05	12	4 Jr 4●	·58		6 F 3	·11	7 Mr 3	·64
2 Au 27	·83	4 S 26	·36	5 O 25	·89	7 N 24○	·42		1 D 23	·95	13	3 Jr 22	·48	5 F 21	·01
1 S 15	·72	3 O 15	·26	4 N 13○	·79	6 D 13	·32	14	7 Jr 11	·85		2 F 10	·38	3 Mr 11	·91
6 S 5	·09	7 O 4	·62	2 N 3○	·15	3 D 2	·68	15	5 Jr 1	·21		6 Jr 30	·74	1 Mr 1	·28
3 Au 25	·46	4 S 23	·99	6 O 23●	·52	1 N 22	·05		2 D 21	·58	16	4 Jr 20	·11	5 F 18	·64
2 S 12○	·36	3 O 11	·89	5 N 10	·42	6 D 9	·95	17	1 Jr 8	·48		3 F 7	·01	4 Mr 8○	·54
6 S 1○	·72	1 O 1	·25	2 O 30	·78	4 N 29	·32		5 D 28	·85	18	7 Jr 27	·88	1 F 25○	·91
5 S 20	·62	7 O 20	·15	1 N 18	·68	3 D 18	·21	19	4 Jr 16○	·74		6 F 15●	·27	7 Mr 16	·80
2 S 9	·99	4 O 9	·52	6 N 8	·05	7 D 7	·58	20	2 Jr 6○	·11		3 F 4	·64	5 Mr 5	·17
7 Au 29	·36	1 S 27	·89	3 O 27	·42	4 N 25	·95		6 D 25○	·48	21	1 Jr 24	·01	2 F 22	·54
6 S 17	·25	7 O 16	·78	2 N 15	·81	3 D 14●○	·84	22	5 Jr 13	·38		7 F 11	·91	1 Mr 13	·44
3 S 6	·62	5 O 6	·15	6 N 4	·68	1 D 4●	·21	23	3 Jr 3	·74		4 F 1	·27	5 Mr 2	·80
1 Au 26	·99	2 S 25	·52	4 O 25○	·05	5 N 23●	·58		7 D 23	·11	24	1 Jr 21	·64	3 F 20	·17
6 S 13	·88	1 O 13○	·42	2 N 11	·95	4 D 11	·48	25	6 Jr 10	·01		7 F 8	·54	2 Mr 10	·07
4 S 3	·25	5 O 2○	·78	7 N 1	·81	1 N 30	·84		3 D 30	·37	26	4 Jr 28	·90	6 F 27	·44
1 Au 23	·62	3 S 22● 4 O 21	15 ·68	6 N 20	·21	Pausha Kshaya			7 D 19	·74	27	2 Jr 18 3 F 16○	·27 ·80	5 Mr 18	·33
7 S 11	·52	2 O 11	·05	3 N 9	·58	5 D 9	·11	28	6 Jr 7	·64		1 F 8●○	·77	2 Mr 6	·70
4 Au 30	·88	6 S 29	·41	7 O 28	·94	2 N 27	·48		4 D 27	·01	29	5 Jr 25○	·45	7 F 24	·07
3 S 18	·78	5 O 18	·31	6 N 16	·84	1 D 16	·37	30	2 Jr 14●	·90		4 F 13	·43	5 Mr 14	·96
1 S 8	·15	2 O 7	·68	4 N 6	·21	5 D 5○	·74	31	7 Jr 4	·27		1 F 2	·80	3 Mr 4	·33
5 Au 28	·52	7 S 27	·05	1 O 26	·58	3 N 25○	·11		4 D 24	·64	32	6 Jr 23	·17	7 F 21	·70
4 S 15	·41	5 O 14	·94	7 N 13●○	·47	2 D 13	·00	33	3 Jr 11	·54		5 F 10	·07	6 Mr 11	·60

A.D. 999 see pages 238 to 241 below.
For tithis by Brahma siddhānta add algebraically —·02 to the above.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era.	Vaiśākha. Week-day.	Vaiśākha. Month.	Vaiśākha. Day.	Vaiśākha. Fraction.	Jyeshṭha. Week-day.	Jyeshṭha. Month.	Jyeshṭha. Day.	Jyeshṭha. Fraction.	Āshāḍha. Week-day.	Āshāḍha. Month.	Āshāḍha. Day.	Āshāḍha. Fraction.	Śrāvaṇa. Week-day.	Śrāvaṇa. Month.	Śrāvaṇa. Day.	Śrāvaṇa. Fraction.	Bhādrapada. Week-day.	Bhādrapada. Month.	Bhādrapada. Day.	Bhādrapada. Fraction.
							A.D.																				
3634	590	455	18M	·8976	22·22861	16·749	**533**	1	Ap	10	·13	2	My	9●	·66	4	Je	8	·19	5	Jl	7	·72	7	Au	6	·25
3635	591	456	19M	·1562	11·38705	12·906	**534**	5	Mr	30○	·49	7	Ap	29●	·02	1	My	28	·56	3	Je	27	·09	4	Jl	26	·62
3636	592	457	19M	·4149	0·44547	9·064	**535**	2 4	Mr Ap	19○ 18	·86 ·39	5	My	17	·92	7	Je	16	·45	1	Jl	15	·98	3	Au	14	·51
3637	593	458	18M	·6736	19·08450	7·198	**536**	1	Ap	6	·76	3	My	6	29	4	Je	4	·82	6	Jl	4	·35	7	Au	2	·88
3638	594	459	18M	·9323	8·19294	8·356	**537**	6	Mr	27	·13	7	Ap	25	·66	2	My	25	·19	3	Je	23	·72	5 6	Jl Au	23 21	·25 ·78
3639	595	460	19M	·1910	26·83226	1·490	**538**	5	Ap	15	·02	6	My	14	·55	1	Je	13	·08	2	Jl	13○	·62	4	Au	11	15
3640	596	461	19M	·4496	15·94039	25·202	**539**	2	Ap	4	39	3	My	3	·92	5	Je	2	·45	6	Jl	1○	·98	1	Jl	31	·51
3641	597	462	18M	·7083	5·04883	21·359	**540**	6	Mr	23	·76	1	Ap	22	·29	2 4	My Je	21 20●	·82 ·35	5	Jl	19	·88	7	Au	18	·41
3642	598	463	18M	·9670	23·68785	19·498	**541**	5	Ap	11	·66	7	My	11○	·19	1	Je	9●	·12	3	Jl	9	·25	4	Au	7	·78
3643	599	464	19M	·2257	12·79629	15·651	**542**	3	Ap	1	·02	4	Ap	30○	·55	6	My	30	·08	7	Je	28	·61	2	Jl	28	·14
3644	600	465	19M	·4844	1·90473	11·809	**543**	7	Mr	21	·39	1 3	Ap My	19●○ 19	·92 ·45	4	Je	17	·95	6	Jl	17	·51	1	Au	16	·04
3645	601	466	18M	·7430	20·54375	9·942	**544**	6	Ap	8●	·29	7	My	7	·82	2	Je	6	·35	3	Jl	5	·88	5	Au	4	·41
3646	602	467	19M	·0017	9·65218	6·100	**545**	3	Mr	28●	·65	5	Ap	27	·28	6	My	26	·72	1	Je	25	·25	2	Jl	24	·78
3647	603	468	19M	·2604	28·29121	4·234	**546**	2	Ap	16	·55	4	My	16	·08	5	Je	14	·61	7	Jl	14	·14	1	Au	12○	·67
3648	604	469	19M	·5191	17·39964	0·392	**547**	6	Ap	5	·92	1	My	5	·45	2	Je	3	·98	4	Jl	3	51	6	Au	2○	04
3649	605	470	18M	·7778	6·50808	24·104	**548**	4	Mr	25	·29	5	Ap	23	·82	7	My	23	·85	1 3	Je Jl	21 21●	·88 ·41	4	Au	19	·94
3650	606	471	19M	·0865	25·14711	22·238	**549**	3	Ap	18	·18	4	My	12	·71	6	Je	11○	·24	7	Jl	10	·78	2	Au	9	·31
3651	607	472	19M	·2951	14·25553	18·395	**550**	7	Ap	2	·55	2	My	2	·08	3	My	31○	·61	5	Je	30	·14	6	Jl	29	67
3652	608	473	19M	·5538	3·36397	14·553	**551**	4	Mr	22	·92	6	Ap	21	·45	7 2	My Je	20● 19	·98 ·51	4	Jl	19	·64	5	Au	17	57
3653	609	474	18M	·8125	22·00300	12·688	**552**	3	Ap	9○	·82	5	My	9	·34	6	Je	7	·88	1	Jl	7	·41	2	Au	5	·94
3654	610	475	19M	0711	11·11143	8·845	**553**	1	Mr	30○	·18	2	Ap	28	·71	4	My	28	·24	5	Je	26	·77	7	Jl	26	·30
3655	611	476	19M	·3299	0·21987	5·012	**554**	5 7	Mr Ap	19●○ 18	·55 ·08	1	My	17	·61	3	Je	16	·14	4	Jl	15	·67	6	Au	14	·20
3656	612	477	19M	·5885	18·85889	3·136	**555**	4	Ap	7	·45	5	My	6	·98	7	Je	5	·51	2	Jl	5	·04	3	Au	3	·57
3657	613	478	18M	·8472	7·96733	26·848	**556**	1	Mr	26	·81	3	Ap	25	·34	4	My	24	·88	6	Je	23	·41	7 2	Jl Au	22○ 21	·94 ·47
3658	614	479	19M	·1059	26·60635	24·982	**557**	7	Ap	14	·71	2	My	14	·24	3	Je	12	·77	5	Jl	12○	·30	6	Au	10	·83
3659	615	480	19M	·3646	15·71472	21·140	**558**	5	Ap	4	·08	6	My	3	·61	1	Je	2	·14	2	Jl	1○	·67	4	Jl	31	·20
3660	616	481	19M	·6233	4·82383	17·298	**559**	2	Mr	24	·45	3	Ap	22	·98	5 7	My Je	22 21●	·51 ·04	1	Jl	20	57	3	Au	19	·10
3661	617	482	18M	·8819	23·46225	15·431	**560**	1	Ap	11	·34	2	My	10○	·87	4	Je	9	·40	5	Jl	8	·94	7	Au	7	47
3662	618	483	19M	·1406	12·57069	11·589	**561**	5	Mr	31	·71	7	Ap	30●○	·24	1	My	29	·77	3	Je	28	·30	4	Jl	27	·83
3663	619	484	19M	·3993	1·67912	7·747	**562**	3	Mr	21	·08	4 6	Ap My	19● 19	·61 ·14	7	Je	17	·67	2	Jl	17	·20	3	Au	15	·73
3664	620	485	19M	·6580	20·81814	5·881	**563**	1	Ap	8	·98	3	My	8	·51	5	Je	7	·03	6	Jl	6	·56	1	Au	5	·10
3665	621	486	18M	·9167	9·42658	2·038	**564**	6	Mr	28	·34	7	Ap	26	·87	2	My	26	·40	3	Je	24	·93	5	Jl	24	·46
3666	622	487	19M	·1753	28·06561	27·727	**565**	5	Ap	16	·24	6	My	15	·77	1	Je	14	·30	2	Jl	13	·83	4	Au	12○	·36
3667	623	488	19M	·1440	17·17403	23·894	**566**	2	Ap	5	·61	4	My	5	·14	5	Je	3	·67	7	Jl	3	·20	1	Au	1●	·73
3668	624	489	19M	·6927	6·28248	20·042	**567**	6	Mr	25	·97	1	Ap	24	·50	3	My	24	·04	4 6	Je Jl	22○ 22●	·57 ·10	7	Au	20	·63
3669	625	490	18M	·9514	24·92150	18·166	**568**	5	Ap	12	·85	7	My	12	·40	1	Je	10●○	·93	3	Jl	10	·46	4	Au	8	·99
3670	626	491	19M	·2101	14·02993	14·333	**569**	3	Ap	2	·74	4	My	1	·77	6	My	31○	·80	7	Je	29	83	2	Jl	29	·34
3671	627	492	19M	·4687	3·13837	10·491	**570**	7	Mr	22	·61	2	Ap	21○	·13	3 5	My Je	20 19	·66 ·19	6	Jl	18	·73	1	Au	17	·26
3672	628	493	19M	·7274	21·77749	8·625	**571**	6	Ap	10○	·50	1	My	10	·03	2	Je	8	·56	4	Jl	8	·09	5	Au	6	·62
3673	629	494	18M	·9861	10·88582	4·783	**572**	3	Mr	29○	·87	5	Ap	28	·40	6	My	27	·93	1	Je	26	·46	2	Jl	25	·99
3674	630	495	19M	·2448	29·52484	0·941	**573**	1 2	Mr Ap	19● 17	·23 ·77	4	My	17	·30	5	Je	15	·83	7	Jl	15	·36	1	Au	13	·89
3675	631	496	19M	·5035	18·63329	26·629	**574**	7	Ap	7	·13	1	My	6	·66	3	Je	5	·19	4	Jl	4	·72	6	Au	3○	·25
3676	632	497	19M	·7621	7·74172	22·787	**575**	4	Mr	27	·50	6	Ap	26	·03	7	My	25	·56	2	Je	24	·09	3 5	Jl Au	23○ 22	·62 ·15
3677	633	498	19M	·0208	26·38074	20·920	**576**	3	Ap	14	·40	4	My	13	·93	6	Je	12	·46	1	Jl	11●○	·99	2	Au	10	·52
3678	634	499	19M	·2795	15·48918	17·078	**577**	7	Ap	3	·76	2	My	3	·29	3	Je	1	·83	7	Jl	1	·36	7	Jl	30	·89
3679	635	500	19M	·5382	4·59761	13·236	**578**	5	Mr	24	·13	6	Ap	22	·66	1 3	My Je	22○ 20	·19 ·72	4	Jl	20	·25	5	Au	18	·78
3680	636	501	19M	·7969	23·23664	11·370	**579**	4	Ap	12	·03	5	My	11○	·56	7	Je	10	·09	1	Jl	9	·62	3	Au	8	·15
3681	637	502	19M	·0555	12·34508	7·527	**580**	1	Mr	31	·40	2	Ap	29	93	4	My	29	·46	5	Je	27	·99	7	Jl	27	·52
3682	638	503	19M	·3142	1·45351	3·684	**581**	5 7	Mr Ap	20○ 19	·76 ·29	1	My	18	·82	3	Je	17	·35	4	Jl	16	·89	6	Au	15	·42
3683	639	504	19M	·5729	20·09253	1·819	**582**	4	Ap	8	·66	6	My	8	·19	7	Je	6	·72	2	Jl	6	·25	3	Au	4	·78
3684	640	505	19M	·8316	9·20097	25·528	**583**	2	Mr	29	·03	3	Ap	27	·56	5	My	27	·09	6	Je	25	·62	1 2	Jl Au	25 23●○	·15 ·68
3685	641	506	19M	·0903	27·83999	23·665	**584**	7	Ap	15	·93	2	My	15	·46	3	Je	13	·99	5	Jl	13	·52	7	Au	12	·85

* For Sūrya siddhānta figures for A.D. 500 to
Ending moments of tithis are the same for Ārya and Sūrya siddhāntas.

from A.D. 600 to A.D. 999 (Ārya siddhānta)*—cont.

Āśvina. Week-day.	Month.	Day.	Fraction.	Kārttika. Week-day.	Month.	Day.	Fraction.	Mārgaśīrsha. Week-day.	Month.	Day.	Fraction	Pausha. Week-day.	Month.	Day.	Fraction.	A.D.	Māgha. Week-day	Month.	Day.	Fraction.	A.D.	Phālguna. Week-day	Month	Day	Fraction.	Chaitra. Week-day.	Month.	Day.	Fraction.
1	S	4	·78	3	O	4	·81	4	N	2	·84	6	D	2	·37		7	D	31	·90	34	2	Jr	30	·43	3	F	28	96
6	Au	25	·15	7	S	23○	·68	2	O	23●	·21	3	N	21	·74		5	D	21	·27	35	6	Jr	19	·80	1	F	18	·33
5	S	13●○	·04	6	O	12	·58	1	N	11	·11	2	D	10	·64	36	4	Jr	9	·17		5	F	7	·70	7	Mr	8○	·23
2	S	1○	41	3	S	30	·94	5	O	30	·47	7	N	29	·00		1	D	28	·53	37	3	Jr	27	·06	4	F	25	·60
1	S	20	·31	2	O	19	·84	4	N	18	·37	5	D	17	·90	38	7	Jr	16○	·48		1	F	14●	·96	3	Mr	16	·49
5	S	9	·68	7	O	9	·21	1	N	7	·74	3	D	7	·27	39	4	Jr	5○	·80		6	F	4	·38	7	Mr	5	·86
3	Au	30	·04	4	S	28	57	6	O	28	·10	7	N	26	·64		2	D	26●○	·17	40	3	Jr	24	·70	5	F	23	·23
1	S	16	·94	3	O	16	·47	5	N	15	·00	6	D	14●	·53	41	1	Jr	13	·06		2	F	11	59	4	Mr	13	·12
6	S	6	·31	7	O	5	·84	2	N	4○	·37	3	D	3	·90	42	5	Jr	2	·43		6	Jr	31	·96	1	Mr	2	·49
3	Au	26	·68	5	S	25	·21	6	O	24○	·74	1	N	23	·27		2	D	22	·80	43	4	Jr	21	·33	5	F	19	·86
2	S	14	·57	4	O	14●○	·10	5	N	12	·63	7	D	12	·16	44	1	Jr	10	·70		3	F	9	·23	4	Mr	9	·76
6	S	2	·94	1	O	2	·47	3	N	1	·00	4	N	30	·53		6	D	30	·06	45	7	Jr	28	·59	2	F	27○	·12
4	Au	23○	·31	5	S	21●	·84	1	N	19	·90	Pausha Kshaya					3	D	19	·43	46	4	Jr	17	·96	1	Mr	18	·02
				7	O	21	37															6	F	16○	·49				
3	S	11	·20	4	O	10	·74	6	N	9	·27	7	D	8	·80	47	2	Jr	7	·82		3	F	5●○	·86	5	Mr	7	·39
7	Au	31	·55	2	S	30	·10	3	O	29	·63	5	N	28	·16		6	D	27	·69	48	1	Jr	26	·22	2	F	24	·76
6	S	18	·47	1	O	18	·00	2	N	16	·53	4	D	16○	·06	49	5	Jr	14	59		7	F	13	·12	1	Mr	14	·65
3	S	7	·80	5	O	7	·37	6	N	5	·90	1	D	5●○	·43	50	2	Jr	3	·96		4	F	2	·49	6	Mr	4	·02
1	Au	28	·20	2	S	26	·73	4	O	26	·26	5	N	24●○	·80		7	D	24	·83	51	1	Jr	22	·86	3	F	21	·39
7	S	16	·14	1	O	15	·63	3	N	14	·16	4	D	18	·69	52	6	Jr	12	·22		7	F	10	·75	2	Mr	11	·28
4	S	4	47	6	O	4○	·00	7	N	2	·53	2	D	2	·06		3	D	31	·59	53	5	Jr	30	·12	6	F	28	·65
1	Au	24	·84	3	S	23○	·37	4	O	22	·90	6	N	21	·43		7	D	20	·96	54	2	Jr	19	·49	4	F	18	·02
7	S	12○	73	2	O	12	·26	3	N	10	·79	5	D	10	·32	55	6	Jr	8	·86		1	F	7	·39	2	Mr	8●	·92
5	S	2	·10	6	O	1	·63	1	O	31	·16	2	N	29	·69		4	D	29	·22	56	5	Jr	27○	·75	7	F	26	·28
4	S	20	·00	5	O	19	·53	7	N	18	·06	1	D	17	59	57	3	Jr	16○	·12		4	F	14	·65	6	Mr	16	·18
1	S	9	·36	2	O	8	·90	4	N	7	·43	5	D	6	·96	58	7	Jr	5○	·49		2	F	4	·02	3	Mr	5	·55
5	Au	29	·73	7	S	28	·25	1	O	27	·79	3	N	26	·32		4	D	25	·85	59	6	Jr	24	·38	7	F	22	·92
4	S	17	·63	6	O	17	·15	7	N	15○	·69	2	D	15	·22	60	3	Jr	13	·75		5	F	12	·28	6	Mr	12	·81
2	S	6	·00	3	O	5	·53	5	N	4○	·06	6	D	3●	·59	61	1	Jr	2	·12		2	Jr	31	·65	4	Mr	2	·18
6	Au	26	·36	7	S	24	·89	2	O	24○	·42	3	N	22	·96		5	D	22	·49	62	7	Jr	21	·02	4	F	19	·55
5	S	14	·26	6	O	13●	·79	1	N	12	·32	2	D	11	·85	63	4	Jr	10	·38		5	F	8	·91	7	Mr	10○	·44
2	S	3○	·63	4	O	3●	·16	5	N	1	·69	7	D	1	·22		1	D	30	·75	64	3	Jr	29	·28	4	F	27○	·81
6	Au	22○	·99	3	O	21	·05	5	N	19	·58	Pausha Kshaya					6	D	19	·12	65	7	Jr	17	·65	3	Mr	17	·71
1	S	21	·52													66	5	Jr	7	·01		2	F	16○	·18				
5	S	10	·89	7	O	10	·42	1	N	8	·95	3	D	8	·48							6	F	5●	·54	1	Mr	7	·07
3	Au	31	·26	4	S	29	·79	6	O	29	·32	7	N	27	·85		2	D	27○	·38	67	4	Jr	25	·91	5	F	24	·44
2	S	19	·16	3	O	18	·69	5	N	17	·22	6	D	16○	·75	68	1	Jr	15	·28		2	F	13	·81	4	Mr	14	·34
6	S	7	·20	1	O	7	·05	2	N	5	·59	4	D	5○	·12	69	5	Jr	3	·64		7	F	2	·18	1	Mr	3	·18
3	Au	27	·89	5	S	26	·42	6	O	25	·95	1	N	24●	·48		3	D	24	·01	70	4	Jr	22	·54	6	F	21	·07
2	S	15	·79	4	O	15○	·32	5	N	13	·85	7	D	13	·38	71	1	Jr	11	·91		3	F	10	·44	4	Mr	11	·97
7	S	5	·15	1	O	4○	·68	3	N	3	·21	4	D	2	·75	72	6	Jr	1	·28		7	Jr	30	·81	2	F	29	·34
4	Au	24	·52	6	S	23●○	·06	7	O	22	·58	2	N	21	·11		3	D	20	·64	73	5	Jr	19	·17	6	F	17	·70
3	S	12●	·42	4	O	11	·95	6	N	10	·48	1	D	10	·01	74	2	Jr	8	·51		4	F	7○	·07	5	Mr	8●	·60
7	S	1●	·79	2	O	1	·32	3	O	30	·85	5	N	29	·38		6	D	28	·91	75	1	Jr	27○	·44	2	F	25	97
6	S	20	·68	1	O	20	·23	2	N	18	·74	4	D	18	·27	76	5	Jr	16○	·81		7	F	15	·34	1	Mr	15	·87
4	S	9	·05	5	O	8	·58	7	N	7	·11	1	D	6	·64	77	3	Jr	5●	·17		4	F	3	·70	6	Mr	5	·20
1	Au	22	·42	2	S	27	·95	4	O	27	·48	6	N	26○	·01		7	D	25●	·54	78	2	Jr	24	·07	3	F	22	·63
7	S	17	·31	1	O	16	·85	3	N	15○	·38	4	D	14	·91	79	6	Jr	13	·44		7	F	11	·97	2	Mr	18	·50
4	S	6	·68	3	O	6	·21	7	N	4○	·74	2	D	4	27	80	3	Jr	2	·80		5	F	1	·83	6	Mr	1	·87
2	Au	26	·05	3	S	24	·58	5	O	24●	·11	6	N	22	·64		1	D	22	·17	81	2	Jr	20	·70	4	F	19	·23
7	S	13○	·95	2	O	13	·48	4	N	12	·01	5	D	11	·54	82	7	Jr	10	·07		1	F	8	·60	3	Mr	10○	·13
5	S	3○	·81	6	O	2	·84	1	N	1	·87	2	N	30	·91		4	D	30	·44	83	6	Jr	28	·97	7	F	27○	·50
4	S	22	·21	5	O	21	·74	7	N	20	·27	1	D	19	·50	84	3	Jr	18	·33		4	F	16●	·86	6	Mr	17	·39
1	S	10	·58	3	O	10	·11	4	N	8	·64	6	D	8	·17	85	7	Jr	6○	·70		2	F	5	·23	3	Mr	6	·76

A.D. 999 see pages 238 to 241 below.

For tithis by Brahama Siddhanta add algebraically — ·02 to the above.

TABLE II.—Solar years and new moons*

Kaliyuga.	Vikrama era.	Saka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era. A.D.	Vaiśākha. Week-day.	Month.	Day.	Fraction.	Jyeshṭha. Week-day.	Month.	Day.	Fraction.	Āshāḍha. Week-day.	Month.	Day.	Fraction.	Śrāvaṇa. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day.	Month.	Day.	Fraction.
3686	642	507	19M	·3490	16·94843	19·823	**585**	5	Ap	5	·29	6	My	4	·82	1	Je	3	·35	2	Jl	2○	·88	4	Au	1●	·41
3687	643	508	19M	·6076	·6·05687	15·980	**586**	2	Mr	25	·66	4	Ap	24	·19	5	My	23	·72	7 1	Je Jl	22○ 21	·25 ·78	3	Au	20	·31
3688	644	509	19M	·8668	24·69588	14·114	**587**	1	Ap	13	·16	3	My	13	·09	4	Je	11●○	·62	6	Jl	11	·15	7	Au	9	·68
3689	645	510	19M	·1250	13·80432	10·273	**588**	5	Ap	1	·92	7	My	1○	·45	1	My	30●	·99	3	Je	29	·52	5	Jl	29	·05
3690	646	511	19M	·3837	2·91276	6·430	**589**	3	Mr	22	·29	4 6	Ap My	20○ 20●	·82 ·35	7	Je	18	·88	2	Jl	18	·41	3	Au	16	·94
3691	647	512	19M	·6424	21·55178	4·563	**590**	2	Ap	10○	·19	3	My	9	·72	5	Je	8	·25	6	Jl	7	·78	1	Au	6	·31
3692	648	513	19M	·9010	10·66022	0·721	**591**	6	Mr	30	·56	1	Ap	29	·09	2	My	28	·62	4	Je	27	·15	3	Jl	26	·68
3693	649	514	19M	·1597	29·29925	26·409	**592**	4 5	Mr Ap	18● 17	·92 ·45	6	My	16	·98	1	Je	15	·51	3	Jl	15	·05	4	Au	13○	·58
3694	650	515	19M	·4184	18·40757	22·568	**593**	2	Ap	6	·82	4	My	6	·35	5	Je	4	·88	7	Jl	4	·41	1	Au	2○	·94
3695	651	516	19M	·6771	7·51611	18·725	**594**	7	Mr	27	·19	1	Ap	25	·75	3	My	25	·25	4	Je	23	·78	6 7	Jl Au	23●○ 21	·31 ·84
3696	652	517	19M	·9358	26·15445	16·858	**595**	6	Ap	15	·09	7	My	14	·62	2	Je	13	·15	3	Jl	12	·68	5	Au	11	·21
3697	653	518	19M	·1944	15·26357	13·016	**596**	3	Ap	3	·45	4	My	2	·98	6	Je	1○	·51	1	Jl	1	·04	2	Jl	30	·57
3698	654	519	19M	4531	4·37201	9·174	**597**	7	Mr	23	·22	2	Ap	22	·35	3 5	My Je	21○ 20	·88 ·41	6	Jl	19	·94	1	Au	18	·47
3699	655	520	19M	·7118	23·01108	7·308	**598**	6	Ap	11	·72	1	My	11●	·25	2	Je	9	·78	4	Jl	9	·31	5	Au	7	·84
3700	656	521	19M	·9705	12·11946	3·466	**599**	4	Ap	1○	·08	5	Ap	30●	·62	7	My	30	·15	1	Je	28	·68	3	Jl	28	·21
3701	657	522	19M	·2292	1·22790	27·178	**600**	1 2	Mr Ap	20○ 18	·46 ·99	4	My	18	·52	6	Je	17	·05	7	Jl	16	·58	2	Au	15	·11
3702	658	523	19M	·4878	19·86693	25·312	**601**	7	Ap	8	·36	1	My	7	·89	3	Je	6	·42	4	Jl	5	·95	6	Au	4	·48
3703	659	524	19M	·7465	8·97535	21·469	**602**	4	Mr	28	·72	6	Ap	27	·25	7	My	26	·79	2	Je	25	·82	3 5	Jl Au	24 23	·85 ·38
3704	660	525	20M	·0052	27·61438	19·603	**603**	3	Ap	16	·62	5	My	16	·15	6	Je	14	·68	1	Jl	14○	·21	2	Au	12	·74
3705	661	526	19M	·2639	16·72282	15·761	**604**	7	Ap	4	·99	2	My	4	·52	4	Je	3	·05	5	Jl	2○	·58	7	Au	1	·11
3706	662	527	19M	·5225	5·83125	11·919	**605**	5	Mr	25	·38	6	Ap	23	·89	1	My	23	·42	2 4	Je Jl	21●○ 21	·95 ·48	6	Au	20	·01
3707	663	528	19M	·7812	24·47028	10·053	**606**	4	Ap	13	·25	5	My	12○	·78	7	Je	11●	·31	1	Jl	10	·85	3	Au	9	·38
3708	664	529	20M	·0399	13·57872	6·210	**607**	1	Ap	2	·62	3	My	2○	·15	4	My	31	·68	6	Je	30	·21	7	Jl	29	·74
3709	665	530	19M	·2986	2·68714	2·368	**608**	5	Mr	21	·99	7 2	Ap My	20●○ 20	·52 ·05	3	Je	18	·58	5	Jl	18	·11	6	Au	16	·64
3710	666	531	19M	·5573	21·32617	0·502	**609**	4	Ap	9●	·89	6	My	9	·42	7	Je	7	·95	2	Jl	7	·48	4	Au	6	·01
3711	667	532	19M	·8160	10·43461	24·215	**610**	2	Mr	30	·25	3	Ap	28	·78	5	My	28	·31	6	Je	26	·84	1	Jl	26	·37
3712	668	533	20M	·0746	29·07363	22·348	**611**	6 1	Mr Ap	19 18	·62 ·15	2	My	17	·68	4	Je	16	·21	6	Jl	15	·74	7	Au	14○	·27
3713	669	534	19M	·3338	18·18207	18·506	**612**	5	Ap	6	·52	7	My	6	·05	1	Je	4	·58	3	Jl	4	·11	4	Au	2○	·64
3714	670	535	19M	·5920	7·29050	14·663	**613**	2	Mr	26	·88	4	Ap	25	·41	5	My	24	·95	7	Je	23	·48	2 3	Jl Au	23● 21	·01 ·54
3715	671	536	19M	·8507	25·92952	12·797	**614**	1	Ap	14	·78	3	My	14	·31	4	Je	12○	·84	6	Jl	12	·37	7	Au	10	·90
3716	672	537	20M	·1094	15·03796	8·955	**615**	6	Ap	4	·15	7	My	3	·68	2	Je	2○	21	3	Jl	1	·74	5	Jl	31	.27
3717	673	538	19M	·3680	4·14640	5·112	**616**	3	Mr	23	·52	5	Ap	22	·05	6 1	My Je	21●○ 20	·58 ·11	2	Jl	19	·64	4	Au	18	·17
3718	674	539	19M	·6267	22·78542	3·246	**617**	2	Ap	11○	·41	3	My	10	·94	5	Je	9	·47	7	Jl	9	·01	1	Au	7	·54
3719	675	540	19M	·8854	11·89386	26·959	**618**	6	Mr	31●○	·78	1	Ap	30	·31	2	My	29	·84	4	Je	28	·37	5	Jl	27	·90
3720	676	541	20M	·1441	1·00229	23·116	**619**	4 5	Mr Ap	21○ 19	·15 ·68	7	My	19	·21	1	Je	17	·74	3	Jl	17	·27	4	Au	15	·80
3721	677	542	19M	·4028	19·64131	21·250	**620**	3	Ap	8	·04	4	My	7	·58	6	Je	6	·11	7	Jl	5	·64	2	Au	4	·17
3722	678	543	19M	·6614	8·74975	17·408	**621**	7	Mr	28	·41	1	Ap	26	·94	3	My	26	·47	5	Je	25	·00	6 1	Jl Au	24○ 23	·53 ·07
3723	679	544	19M	·9201	27·38878	15·542	**622**	6	Ap	16	·31	7	My	15	·84	2	Je	14	·37	3	Jl	13○	·90	5	Au	12	·43
3724	680	545	20M	·1788	16·49720	11·699	**623**	3	Ap	5	·68	5	My	5	·21	6	Je	3	·74	1	Jl	3○	·27	2	Au	1	·80
3725	681	546	19M	·4375	5·60564	7·857	**624**	1	Mr	25	·06	2	Ap	23	·57	4	My	23○	·11	5 7	Je Jl	21 21	·64 ·17	1	Au	19	·70
3726	682	547	19M	·6962	24·24467	5·990	**625**	6	Ap	12	·94	1	My	12○	·47	3	Je	11	·00	4	Jl	10	·53	6	Au	9	·06
3727	683	548	19M	·9548	13·35310	2·149	**626**	4	Ap	2	·81	5	My	1○	·84	7	My	31	·87	1	Je	29	·90	3	Jl	29	·43
3728	684	549	20M	·1213	2·46154	25·861	**627**	1	Mr	22	·68	3 4	Ap My	21● 20	·21 ·74	6	Je	19	·27	7	Jl	18	·80	2	Au	17	·33
3729	685	550	19M	·4722	21·10057	23·985	**628**	7	Ap	9●	·57	2	My	9	·10	3	Je	7	·63	5	Jl	7	·17	6	Au	5	·70
3730	686	551	19M	·7309	10·20899	20·153	**629**	4	Mr	29	·94	6	Ap	28	·47	1	My	28	·00	2	Je	26	·53	4	Jl	26	·06
3731	687	552	19M	·9896	28·84802	18·286	**630**	3	Ap	17	·84	5	My	17	·37	6	Je	15	·90	1	Jl	15	·43	2	Au	13●○	·96
3732	688	553	20M	·2483	17·95646	14·444	**631**	1	Ap	7	·21	2	My	6	·74	4	Je	5	·27	5	Jl	4	·80	7	Au	3	·33
3733	689	554	19M	·5069	7·06489	10·602	**632**	5	Mr	26	·56	7	Ap	25	·10	1	My	24	·63	3 4	Je Jl	23○ 22	·16 ·69	6	Au	21	·23
3734	690	555	19M	·7656	25·70392	8·735	**633**	4	Ap	14	·47	6	My	14	·00	7	Je	12●○	·53	2	Jl	12	·06	3	Au	10	·59
3735	691	556	20M	·0243	14·81236	4·893	**634**	1	Ap	3	·84	3	My	3	·37	4	Je	1○	·90	6	Jl	1	·43	7	Jl	30	·96
3736	692	557	20M	·2830	8·92078	1·051	**635**	6	Mr	24	·20	7	Ap	22○	·73	2 3	My Je	22 20	·27 ·88	5	Jl	20	·33	6	Au	18	·86

* For Sūrya siddhānta figures for A.D. 500 to
Ending moments of tithis are the same for Arya Sūrya Siddhāntas.

from A.D. 500 to A.D. 999 (Ārya siddhānta)*—cont.

Āśvina.				Kārttika.				Mārgaśīrsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
5	Au	30	·95	7	S	29	·48	2	O	29	·01	3	N	27	·54		5	D	27○	·07	86	6	Jr	25	·10	1	F	24	·13
4	S	18	·84	6	O	18	·37	7	N	16	·90	2	D	16●○	·39	87	3	Jr	14	·97		5	F	13	·50	7	Mr	15	·08
2	S	8	·21	3	O	7	·74	5	N	6	·27	6	D	5	·80	88	1	Jr	4	·33		2	F	2	·86	4	Mr	8	·39
6	Au	27	·58	1	S	26	·11	3	O	25○	·64	4	N	24	·17		5	D	23	·70	89	7	Jr	22	·23	1	F	20	·76
5	S	15	·47	7	O	15●○	01	1	N	18	·54	3	D	13	·07	90	4	Jr	11	·60		6	F	10	·18	7	Mr	11	·66
2	S	4	·84	4	O	4●○	·37	5	N	2	·90	7	D	2	·43		2	D	31	·96	91	3	Jr	30	·49	5	Mr	1	·03
7	Au	25	·21	1	S	23●	·74	3	O	23	·27	4	N	21	·80		6	D	21	·33	92	7	Jr	19	·86	2	F	18○	·39
6	S	12	·11	7	O	11	·64	2	N	10	·17	3	D	9	·70	93	5	Jr	8	·28		6	F	6○	·7[illegible]	1	Mr	8	·29
3	S	1	47	5	O	1	·00	6	O	30	·53	1	N	29	·07		2	D	28	·60	94	4	Jr	27●○	·18	5	F	25	·66
2	S	20	·37	3	O	19	·90	5	N	18	·43	6	D	17	·96	95	1	Jr	16●	·55		3	F	15	·02	4	Mr	16	·55
6	S	9	74	1	O	9	·27	2	N	7	·80	4	D	7○	·33	96	5	Jr	5	·86		7	F	4	·89	1	Mr	4	·92
4	Au	29	·12	5	S	27	·64	7	O	27	·17	1	N	25○	·70		3	D	25●	·23	97	4	Jr	28	76	6	F	22	·29
3	S	17	·00	4	O	16	·53	6	N	15○	·06	7	D	14	59	98	2	Jr	18	·13		3	F	11	·66	5	Mr	13	·19
7	S	6	·37	1	O	5	·90	3	N	4	·43	4	D	8	96	99	6	Jr	2	·49		1	F	1	·02	2	Mr	2	·55
4	Au	26	·74	6	S	25○	·27	7	O	24	·80	2	N	23	·88		6	D	22	·86	600	5	Jr	21	·39	6	F	19	·92
3	S	13○	·64	5	O	13	·17	6	N	11	·70	1	D	11	·23	01	2	Jr	9	·77		4	F	8	·30	5	Mr	9●○	·83
1	S	3○	·01	2	O	2	·54	4	N	1	·07	5	N	30	60		7	D	30	13	02	1	Jr	28	·63	3	F	27	·19
6	S	21	·91	1	O	21	·44	2	N	19	97	4	D	19	·50	03	6	Jr	18○	·03		7	F	16	·56	2	Mr	18	09
4	S	11	·27	5	O	10	·81	7	N	9	·34	1	D	8	·87	04	3	Jr	7●○	40		4	F	5	·93	6	Mr	6	·46
1	Au	30	·64	3	S	29	·17	4	O	28	·70	6	N	27	·23		7	D	26●○	16	05	2	Jr	25	·29	3	F	28	·83
7	S	18	·54	2	O	18	·07	3	N	16	·60	5	D	16	·13	06	6	Jr	14	·66		1	F	13	·19	2	Mr	14	72
4	S	7	·91	6	O	7	·44	7	N	5○	·97	2	D	5	·50	07	4	Jr	4	·03		5	F	2	·56	7	Mr	4	·09
2	Au	28	·27	3	S	26	·80	5	O	26○	·33	6	N	24	·87		1	D	24	·40	08	2	Jr	22	·98	4	F	21	·46
1	S	15	·17	2	O	14○	·70	4	N	13	23	5	D	12	·76	09	7	Jr	11	·29		7	F	9	·82	3	Mr	11	·35
5	S	4	·54	7	O	4	·07	1	N	2	·60	3	D	2	·13		4	D	31	·66	10	5	Jr	30	·19	7	F	28○	·72
2	Au	24○	·91	4	S	23	·44	Mārgaśīrsha Kshaya				7	N	21	·50		2	D	21	·03	11	3	Jr	19	56	6	F	18○	·09
				5	O	22	·97																						
1	S	12	·80	3	O	12	38	4	N	10	·86	6	D	10	·89	12	7	Jr	8	·98		2	F	7○	·46	3	Mr	7	99
6	S	1	·17	7	S	30	·70	2	O	30	·23	3	N	28	·76		5	D	28	·29	13	6	Jr	26	·82	1	F	25	·85
5	S	20	·07	6	O	19	·60	1	N	18	·13	2	D	17○	·66	14	4	Jr	16	·19		5	F	14	·72	7	Mr	16	·25
2	S	9	·43	3	O	8	·97	5	N	7	·50	7	D	7○	·03	15	1	Jr	5	·56		3	F	4	·09	4	Mr	5	·62
6	Au	29	·80	1	S	28	·33	2	O	27	·86	4	N	26○	·39		5	D	25	·92	16	7	Jr	24	45	2	F	23	·98
5	S	16	·70	7	O	16	·23	1	N	14●	·76	3	D	14	·29	17	4	Jr	12	82		6	F	11	·35	7	Mr	12	·88
3	S	6	·07	4	O	5○	·60	6	N	4●	·13	7	D	3	·66	18	2	Jr	2	·19		3	Jr	31	·72	5	Mr	2	·25
7	Au	26	·48	1	S	24○	·96	3	O	24●	·49	5	N	23	·03		6	D	22	·56	19	1	Jr	21	·19	2	F	19	·62
6	S	14○	·33	7	O	13	·86	2	N	12	·39	3	D	11	92	20	5	Jr	10	·45		6	F	8	·98	1	Mr	9●	·51
3	S	2●	·70	5	O	2	·23	6	O	31	·76	1	N	30	·29		2	D	29	·82	21	4	Jr	28○	·35	5	F	26	·88
2	S	21	60	4	O	21	·13	5	N	19	·66	7	D	19	·19	22	1	Jr	17○	72		3	F	16	25	4	Mr	17	·78
6	S	10	·96	1	O	10	49	3	N	9	·12	4	D	8	·55	23	6	Jr	7○	·09		7	F	5	·62	2	Mr	7	·15
4	Au	31	·33	5	S	29	·86	7	O	29	·39	1	N	27	·92		3	D	27●	·45	24	4	Jr	25	·98	6	F	24	·51
3	S	18	·23	4	O	17	78	6	N	16○	·29	7	D	15●	·82	25	2	Jr	14	·35		3	F	12	·88	5	Mr	14	·41
7	S	7	·60	2	O	7	·13	3	N	5○	·66	5	D	5	·19	26	6	Jr	3	·72		1	F	2	·25	2	Mr	3	·78
4	Au	27	·96	6	S	26	·49	1	O	26●○	·02	2	N	24	·55		4	D	24	·08	27	5	Jr	22	67	7	F	21	·15
3	S	15	·83	5	O	15●	·39	6	N	13	·92	1	D	13	·45	28	2	Jr	11	·98		4	F	10	·51	6	Mr	11○	·04
1	S	4○	·23	2	O	3●	·76	4	N	2	·29	5	D	1	·82		7	D	31	35	29	1	Jr	29	·88	3	F	28○	·41
5	Au	24○	·59	1	O	22	·65	3	N	21	·19	Pausha Kshaya					4	D	20	·72	30	6	Jr	19	·25	7	F	17○	·78
7	S	23	·12																							2	Mr	19	·31
4	S	12	·49	6	O	12	·02	7	N	10	·55	2	D	10	·08	31	3	Jr	8	·61		5	F	7●	·14	6	Mr	8	·67
1	S	1	·86	3	O	1	·39	4	O	30	·92	6	N	29	45		7	D	28○	98	32	2	Jr	27●	·51	4	F	26	·05
7	S	19	·76	2	O	19	·29	3	N	17	·82	5	D	17○	·35	33	6	Jr	15	·88		1	F	14	·41	2	Mr	15	·94
5	S	9	·12	6	O	8	·65	1	N	7	·18	2	D	6○	·71	34	4	Jr	5	·25		5	F	3	·78	7	Mr	5	·31
2	Au	29	·49	4	S	28	·02	5	O	27	·55	7	N	26●	·08		1	D	25	·61	35	3	Jr	24	·14	4	F	22	·67
1	S	17	·39	2	O	16○	·92	4	N	15	·45	5	D	14	·98	36	7	Jr	13	·51		2	F	12	·04	3	Mr	12	·57

* A.D. 999 see pages 238 to 241 below.
For tithis by Brahma siddhānta add algebraically — ·02 to the above.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era.	Vaiśākha. Week-day.	Vaiśākha. Month.	Vaiśākha. Day.	Vaiśākha. Fraction.	Jyeshṭha. Week-day.	Jyeshṭha. Month.	Jyeshṭha. Day.	Jyeshṭha. Fraction.	Āshāḍha. Week-day.	Āshāḍha. Month.	Āshāḍha. Day.	Āshāḍha. Fraction.	Śrāvaṇa. Week-day.	Śrāvaṇa. Month.	Śrāvaṇa. Day.	Śrāvaṇa. Fraction.	Bhādrapada. Week-day.	Bhādrapada. Month.	Bhādrapada. Day.	Bhādrapada. Fraction.
							A.D.																				
3737	693	558	19M	·5417	22·55981	26·739	636	5	Ap	11○	·10	6	My	10	·68	1	Je	9	·16	2	Jl	8	·69	4	Au	7	·22
3738	694	559	19M	·8003	11·66825	22·897	637	2	Mr	31●○	·47	4	Ap	30	00	5	My	29	·53	7	Je	28	·07	1	Jl	27	·59
3739	695	560	20M	·0590	0·77698	19·055	638	6 1	Mr Ap	20● 19	84 ·37	2	My	18	·90	4	Je	17	·43	5	Jl	16	·96	7	Au	15	·49
3740	696	561	20M	·3177	19·41570	17·188	639	5	Ap	8	·73	7	My	8	·26	1	Je	6	79	3	Jl	6	·83	4	Au	4○	86
3741	697	562	19M	·5764	8·52414	13·346	640	3	Mr	28	·10	4	Ap	26	63	6	My	26	·16	7	Je	24	·69	2 3	Jl Au	24○ 22	·22 ·75
3742	698	563	19M	·8351	27·16316	11·480	641	2	Ap	16	00	3	My	15	·53	5	Je	14	·06	6	Jl	13○	·59	1	Au	12	·12
3743	699	564	20M	·0937	16·27160	7·638	642	6	Ap	5	·37	7	My	4	·90	2	Je	3	·43	3	Jl	2	96	5	Au	1	·49
3744	700	565	20M	·3524	5·38004	3·795	643	3	Mr	25	·73	5	Ap	24	·26	6 1	My Je	23○ 22●	·79 ·52	2	Jl	21	·85	4	Au	20	39
3745	701	566	19M	·6111	24·01906	1·929	644	2	Ap	12	63	4	My	12○	·16	5	Je	10	·69	7	Jl	10	·72	1	Au	8	·75
3746	702	567	19M	·8698	13·12749	25·641	645	7	Ap	2	·00	1	My	1	·53	3	My	31	·06	4	Je	29	·54	6	Jl	29	·12
3747	703	568	20M	·1285	2·23593	21·799	646	4	Mr	22○	·36	5 7	Ap My	20● 20	·89 ·43	1	Je	18	·96	3	Jl	18	·41	5	Au	17	·02
3748	704	569	20M	·3871	20·87495	19·933	647	3	Ap	10	·26	4	My	9	·79	6	Je	8	82	7	Jl	7	·85	2	Au	6	·39
3749	705	570	19M	·6458	0·98339	16·091	648	7	Mr	29	·63	2	Ap	28	·16	3	My	27	·69	5	Je	26	·22	6	Jl	25	·75
750	706	571	19M	·9045	28·62242	14·234	649	6	Ap	17	·53	1	My	17	·06	2	Je	15	·59	4	Jl	15	·12	5	Au	13	·65
751	707	572	20M	·1632	17·78084	10·383	650	3	Ap	6	·89	5	My	6	42	6	Je	4	·95	1	Jl	4○	·49	3	Au	3●	·02
3752	708	573	20M	·4219	6·83928	6·540	651	1	Mr	27	·26	2	Ap	25	·79	4	My	25	·32	5 7	Je Jl	23○ 23	·85 ·38	1	Au	21	·91
3753	709	574	19M	·6805	25·47831	4·694	652	7	Ap	14	·16	1	My	13	·69	3	Je	12○	·22	4	Jl	11	·75	6	Au	10	·28
3754	710	575	19M	·9392	14·58674	0·831	653	4	Ap	3	·53	6	My	3	06	7	Je	1●	·59	2	Jl	1	·12	3	Jl	30	·65
3755	711	576	20M	·1979	3·69518	24·544	654	1	Mr	23	·89	3	Ap	22○	·42	4 6	My Je	21 20	·95 ·48	1	Jl	20	01	2	Au	18	·55
3756	712	577	20M	·4566	22·38420	22·677	655	7	Ap	11●○	·79	2	My	11	32	3	Je	9	·85	5	Jl	9	38	6	Au	7	·91
3757	713	578	19M	·7153	11·44264	18·835	656	5	Mr	31	·16	6	Ap	29	·69	1	My	29	·22	2	Je	27	·75	4	Jl	27	·28
3758	714	579	19M	·9738	0·55107	14·993	657	2 4	Mr Ap	20 19	·52 05	5	My	18	·59	7	Je	17	·12	1	Jl	16	·65	3	Au	15○	·18
3759	715	580	20M	·2325	19·19003	13·127	658	1	Ap	8	42	2	My	7	·95	4	Je	6	·48	6	Jl	6	·01	7	Au	4○	·54
3760	716	581	20M	·4913	8·29914	9·285	659	5	Mr	28	79	7	Ap	27	·32	1	My	26	·85	3	Je	25	·38	4 6	Jl Au	24●○ 23	91 ·44
3761	717	582	19M	·7500	26·93756	7·418	660	4	Ap	15	69	6	My	15	·22	7	Je	13	75	2	Jl	13●	·28	3	Au	11	·81
3762	718	583	20M	·0087	16·04600	3·576	661	2	Ap	5	05	3	My	4	·58	5	Je	3○	·11	6	Jl	2●	·65	1	Au	1	·18
3763	719	584	20M	·2673	5·15443	27·288	662	6	Mr	25	·42	7	Ap	23	·95	2 4	My Je	23●○ 22	·48 01	5	Jl	21	54	7	Au	20	·07
3764	720	585	20M	·5260	23·79345	25·422	663	5	Ap	13	·32	6	My	12●	·85	1	Je	11	·38	2	Jl	10	·91	4	Au	9	·44
3765	721	586	19M	·7847	12·90189	21·580	664	2	Ap	1○	·69	4	My	1	·22	5	My	30	·75	7	Je	29	·28	1	Jl	28	·81
3766	722	587	20M	·0434	2·01033	17·737	665	7	Mr	22○	·05	1 3	Ap My	20● 20	·58 ·11	4	Je	18	·64	6	Jl	18	·17	7	Au	16	·71
3767	723	588	20M	·3021	20·64934	15·871	666	5	Ap	9	·95	7	My	9	·48	2	Je	8	·01	3	Jl	7	·54	5	Au	6	·07
3768	724	589	20M	·5608	9·75779	12·029	667	3	Mr	30	·32	4	Ap	28	·85	6	My	28	·38	7	Je	26	·91	2	Jl	26	·44
3769	725	590	19M	·8194	28·39681	10·163	668	2	Ap	17	·21	3	My	16	·75	5	Je	15	·28	6	Jl	14○	·81	1	Au	13	·84
3770	726	591	20M	·0781	17·50524	6·320	669	6	Ap	6	·58	1	My	6	·11	2	Je	4	·64	4	Jl	4○	·17	5	Au	2	·70
3771	727	592	20M	·3368	6·61368	2·478	670	3	Mr	26	·95	5	Ap	5	·48	7	My	25	01	1 3	Je Jl	23●○ 23	54 ·07	4	Au	21	·60
3772	728	593	20M	·5955	25·25280	0·612	671	2	Ap	14	·85	4	My	14	·38	5	Je	12	·91	7	Jl	12	·44	1	Au	10	·97
3773	729	594	19M	·8542	14·36113	24·324	672	7	Ap	3	·21	1	My	2○	·74	3	Je	1●	·27	4	Je	30	·81	6	Jl	30	·34
3774	730	595	20M	·1128	3·46957	20·483	673	4	Mr	23	·58	6	Ap	22○	11	7 2	My Je	21 20	·64 ·17	3	Jl	19	·70	5	Au	18	22
3775	731	596	20M	·3715	22·10860	18·616	674	3	Ap	11●	·48	5	My	11	·01	6	Je	9	·54	1	Jl	9	·07	2	Au	7	·60
3776	732	597	20M	·6302	11·21703	14·773	675	7	Mr	31	·85	2	Ap	30	·38	3	My	29	·91	5	Je	28	·44	6	Jl	27	·97
3777	733	598	19M	8889	0·32546	10·931	676	5 6	Mr Ap	20 18	·21 ·74	1	My	18	·27	2	Je	16	·80	4	Jl	16	·33	6	Au	14○	·87
3778	734	599	20M	·1476	18·96449	9·065	677	4	Ap	8	·11	5	My	7	64	7	Je	6	·17	1	Jl	5	·70	3	Au	4○	·23
3779	735	600	20M	·4062	8·07292	5·223	678	1	Mr	28	48	3	Ap	27	·01	4	My	26	·54	6	Je	25	·07	7 2	Jl Au	24● 23	·60 ·13
3780	736	601	20M	·6649	26·71195	3·356	679	7	Ap	16	·37	1	My	15	·91	3	Je	14○	·44	4	Jl	13●	·97	6	Au	12	·50
3781	737	602	19M	9236	15·82039	27·069	680	4	Ap	4	·74	6	My	4	·27	7	Je	2○	·80	2	Jl	2	·33	3	Jl	31	·86
3782	738	603	20M	·1823	4·92882	23·226	681	2	Mr	25	·11	3	Ap	23	·64	5 6	My Je	23● 21	·17 ·70	1	Jl	21	·23	2	Au	19	·76
3783	739	604	20M	·4410	23·56784	21·860	682	1	Ap	13	·01	2	My	12●	·54	4	Je	11	·07	5	Jl	10	·60	7	Au	9	·13
3784	740	605	20M	·6996	12·67628	17·518	683	5	Ap	2○	·37	6	My	1	·90	1	My	31	·43	2	Je	29	·97	4	Jl	29	·50
3785	741	606	19M	·9583	1·78471	13·676	684	2	Mr	21○	·74	4 5	Ap My	20 19	·27 ·80	7	Je	18	·33	1	Jl	17	·86	3	Au	16	·39
3786	742	607	20M	·2170	20·42374	11·809	685	1	Ap	9	·64	3	My	9	·17	4	Je	7	·70	6	Jl	7	23	7	Au	5	·76
3787	743	608	20M	·4757	9·53218	7·967	686	6	Mr	30	·01	7	Ap	28	·54	2	My	28	·07	3	Je	26	·60	5	Jl	26○	·13
3788	744	609	20M	·7344	28·17119	6·101	687	4	Ap	17	·90	6	My	17	·43	7	Je	15	·96	2	Jl	15○	·49	4	Au	14	·03

* For Sūrya siddhānta figures for A.D. 500 to

Ending moments of tithis are the samefor Ārya and Sūrya siddhāntas.

from A.D. 500 to A.D. 999 (Ārya siddhānta)* —cont.

Āśvina.				Kārttika.				Mārgaśirsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction
5	S	5	·75	7	O	5○	·29	1	N	3	·82	3	D	3	·35	37	4	Jr	1	·88		6	Jr	31	·41	7	Mr	1	·94
3	Au	26	·12	4	S	24●○	·65	6	O	24	·18	7	N	22	·71		2	D	22	·21	38	3	Jr	20	·77	5	F	19	·30
2	S	14	·02	3	O	13	·55	5	N	12	·08	6	D	11	·61	39	1	Jr	10	·14		2	F	8○	·67	4	Mr	10	·20
6	S	3●	·39	7	O	2	·92	2	N	1	·45	4	N	30	·98		5	D	30	·51	40	7	Jr	29○	·04	1	F	27	·53
5	S	21	·28	6	O	20	·81	1	N	19	·35	2	D	18	·88	41	4	Jr	17●○	·41		5	F	15	·94	7	Mr	17	·40
2	S	10	·65	4	O	10	·18	5	N	8	·71	7	D	8	·24	42	1	Jr	6	77		3	F	5	·30	4	Mr	6	·87
7	Au	31	·02	1	S	29	·55	3	O	29	·08	4	N	27○	·61		6	D	27●	·14	43	7	Jr	25	·67	2	F	24	·72
5	S	18	·92	7	O	18	·45	1	N	16●○	98	3	D	16	·51	44	5	Jr	15	·04		6	F	13	·57	1	Mr	14	·10
3	S	7	·28	4	O	6	·81	6	N	5●○	·34	7	D	4	·87	45	2	Jr	3	·41		3	F	1	·94	5	Mr	3	·47
7	Au	27	·65	2	S	26	·18	3	O	25●	·71	5	N	24	·24		6	D	23	·77	46	1	Jr	22	·30	2	F	20	·83
6	S	15○	·55	1	O	15	·08	2	N	13	·61	4	D	13	·14	47	5	Jr	11	·67		7	F	10	·20	1	Mr	11○	·73
3	S	4○	·91	5	O	4	·45	6	N	2	·90	1	D	2	·51	48	3	Jr	1	·04		4	Jr	30	·57	6	F	29●○	·10
1	Au	24●○	·28	2 4	S O	22 22	·81 ·34	5	N	20	·87	7	D	20	·40	49	1	Jr	18	·93		3	F	17●	·47	5	Mr	19	·00
7	S	12	·18	1	O	11	·71	3	N	10	·24	4	D	9	·77	50	6	Jr	8○	·30		7	F	6	·83	2	Mr	8	·36
4	S	1	·55	6	O	1	·08	7	O	30	·61	2	N	29	·14		3	D	28○	·67	51	5	Jr	27●	·20	6	F	25	·73
3	S	20	·44	4	O	19	·97	6	N	18	51	1	D	18●○	04	52	2	Jr	16	·57		4	F	15	·10	5	Mr	15	·63
7	S	8	·81	2	O	8	·34	3	N	6	·87	5	D	6	·40	53	6	Jr	4	·93		1	F	3	·46	3	Mr	4	·99
5	Au	29	·18	6	S	27	·71	1	O	27○	·24	2	N	25●	77		4	D	25	·30	54	5	Jr	23	·83	7	F	22	·36
4	S	17	·08	5	O	16○	·61	7	N	15	·14	1	D	14	·67	55	3	Jr	13	·20		4	F	11	·73	6	Mr	13	·26
1	S	6	·41	2	O	5○	·90	4	N	4	·50	6	D	4	·03	56	7	Jr	2	·57		2	F	1	·10	3	Mr	1	·63
5	Au	25	·81	7	S	24	·34	1	O	23	·87	3	N	22	40		4	D	21	·93	57	6	Jr	20	·46	7	F	18○	·99
4	S	13	·71	6	O	13	·24	7	N	11	·77	2	D	11	·30	58	3	Jr	9	·83		5	F	8○	·36	6	Mr	9	·89
2	S	3●	·07	3	O	2	·61	5	N	1	·14	6	N	30	·67		1	D	30	·20	59	2	Jr	28○	·73	4	F	27	·26
7	S	21	·97	2	O	21	·50	4	N	20	03	5	D	19	·56	60	7	Jr	18●	·09		1	F	16	·62	3	Mr	17	·16
5	S	10	·34	6	O	9	·87	1	N	8	40	2	D	7○	·93	61	4	Jr	6	·46		5	F	4	·99	7	Mr	6	·59
2	Au	30	·71	4	S	29	·24	5	O	28	·77	7	N	27○	·30		1	D	26	·83	62	3	Jr	25	36	4	F	23	·89
1	S	18	·60	3	O	18	·13	4	N	16○	·67	6	D	16	20	63	7	Jr	14	·73		2	F	13	·26	3	Mr	14	·79
5	S	7	·98	7	O	7	·50	2	N	6	·03	3	D	5	·56	64	5	Jr	4	09		6	F	2	·62	1	Mr	3	·15
2	Au	27	·34	4	S	25○	·87	6	O	25	40	7	N	23	·93		2	D	23	46	65	3	Jr	21	99	5	F	20	·52
2	S	15○	·24	3	O	14	·77	5	N	13	·30	6	D	12	·83	66	1	Jr	11	36		2	F	9	·89	4	Mr	11○	·42
6	S	4○	.60	1	O	4	·13	2	N	2	66	4	D	2	19		5	D	31	·73	67	7	Jr	30	·26	1	F	28	·79
4	Au	24●	·97	5 7	S O	23 23	50 ·03	1	N	21	56	3	D	21	09	68	4	Jr	19○	·62		6	F	18	15	7	Mr	18	·68
2	S	11	87	4	O	11	·40	6	N	9	·93	7	D	9	·46	69	2	Jr	8○	·09		3	F	6	52	5	Mr	8	·05
7	S	1	23	1	S	30	·77	3	O	30	·30	4	N	28	·83		6	D	28○	·36	70	7	Jr	26	89	2	F	25	·42
6	S	20	·13	7	O	19	·66	2	N	18	·19	3	D	17●	·72	71	5	Jr	16	·25		6	F	14	·79	1	Mr	16	·32
3	S	9	·50	5	O	9	·03	6	N	7○	·56	1	D	7●	·09	72	2	Jr	5	·62		4	F	4	15	5	Mr	4	·68
7	Au	28	·87	2	S	27	·40	3	O	26○	·93	5	N	25●	·46		6	D	24	·99	73	1	Jr	23	·52	3	F	22	·05
6	S	16	76	1	O	16○	·29	2	N	14	·83	4	D	14	·36	74	5	Jr	12	89		7	F	11	·42	1	Mr	12	·95
4	S	6	13	5	O	5●	66	7	N	4	·19	1	D	3	·72	75	3	Jr	2	·25		4	Jr	31	·78	5	Mr	2○	·31
1	Au	26○	·50	3	S	25	·03	4	O	24	·56	6	N	23	·09		7	D	22	62	76	2	Jr	21	·15	3	F	19○	·68
7	S	13	40	1	O	12	·93	3	N	11	·46	4	D	10	·99	77	6	Jr	9	·52		1	F	8○	05	2	Mr	9	58
4	S	2	·76	6	O	2	·29	7	O	31	·82	2	N	30	·35		3	D	29	·89	78	5	Jr	28●	·42	6	F	26	95
3	S	21	·66	5	O	21	·19	6	N	19	·72	1	D	19○	25	79	2	Jr	17	·78		4	F	16	·31	5	Mr	17	·85
1	S	11	·03	2	O	10	·56	1	N	9	·09	5	D	8○	·62	80	7	Jr	7	·15		1	F	5	·68	3	Mr	6	·21
5	Au	30	·39	6	S	28	·93	1	O	28	46	2	N	26●○	·99		4	D	26	·52	81	6	Jr	25	·05	7	F	23	·58
4	S	18	·29	5	O	17	·82	7	N	16●	·35	1	D	15	·88	82	3	Jr	14	41		4	F	12	·95	6	Mr	14	·48
1	S	7	66	3	O	7○	·19	4	N	5●	·72	6	D	5	25	83	7	Jr	3	·78		2	F	2	·31	3	Mr	3	·84
6	Au	28	·03	7	S	26○	·56	2	O	26	·09	3	N	24	·62		5	D	24	·15	84	6	Jr	22	·68	1	F	21	·21
4	S	14○	·92	6	O	14	·45	7	N	12	·99	2	D	12	·52	85	4	Jr	11	·05		5	F	9	·58	7	Mr	11	·11
2	S	4	·29	3	O	3	·82	5	N	2	·35	6	D	1	·88		1	D	31	·41	86	2	Jr	29○	·94	4	F	28●	·47
6	Au	24	68	1 2	S O	23 22	·19 ·72	4	N	21	·25	5	D	20	78	87	7	Jr	19○	·31		1	F	17	·84	3	Mr	19	·37
5	S	12	·56	7	O	12	·09	1	N	10	·62	3	D	10	·15	88	4	Jr	8○	·68		6	F	7	·21	7	Mr	7	·74

A.D. 999 see pages 238 to 241 below.

For tithis by Brahma siddhānta add algebraically - ·02 to the above.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year	Anomaly of first new moon.	Christian era. A.D.	Vaiśākha. Week-day.	Vaiśākha. Month.	Vaiśākha. Day.	Vaiśākha. Fraction.	Jyeshṭha. Week-day.	Jyeshṭha. Month.	Jyeshṭha. Day.	Jyeshṭha. Fraction.	Āshāḍha. Week-day.	Āshāḍha. Month.	Āshāḍha. Day	Āshāḍha. Fraction	Śrāvaṇa. Week-day.	Śrāvaṇa. Month.	Śrāvaṇa. Day.	Śrāvaṇa. Fraction.	Bhādrapada.* Week-day.	Bhādrapada.* Month.	Bhādrapada.* Day.	Bhādrapada.* Fraction.
3789	745	610	19M	·9930	17·27868	2·259	**688**	2	Ap	6	·27	3	My	5	·80	5	Je	4	·38	6	Jl	3●○	·86	1	Au	2	·39
3790	746	611	20M	·2517	6·38807	25·971	**689**	6	Mr	26	·64	1	Ap	25	·17	2	My	24	·70	4 5	Je Jl	23 22	·23 ·76	7	Au	21	·29
3791	747	612	20M	·5104	25·02709	24·105	**690**	5	Ap	14	·53	7	My	14○	·07	1	Je	12	·60	3	Jl	12	·13	4	Au	10	·66
3792	748	613	20M	·7691	14·13558	20·262	**691**	2	Ap	8	90	4	My	3○	·43	5	Je	1	·96	7	Jl	1	·49	2	Jl	31	·02
3793	749	614	20M	·0278	3·24397	16·420	**692**	7	Mr	23	·27	1	Ap	21●	·80	3 4	My Je	21 19	·33 ·86	6	Jl	19	·39	7	Au	17	·92
3794	750	615	20M	·2864	21·88298	14·554	**693**	6	Ap	11●	·17	7	My	10	·70	2	Je	9	·23	3	Jl	8	·76	5	Au	7	·29
3795	751	616	20M	·5451	10·99142	10·712	**694**	3	Mr	31	·53	5	Ap	30	·06	6	My	29	59	1	Je	28	·13	2	Jl	27	·66
3796	752	617	20M	·8038	0·09985	6·869	**695**	2	Ap	19	·43	3	My	18	96	5	Je	17	·49	7	Jl	17	·02	1	Au	15○	·55
3797	753	618	20M	·0625	18·73888	5·003	**696**	6	Ap	7	·80	1	My	7	·83	2	Je	5	·86	4	Jl	5	·39	5	Au	3	·92
3798	754	619	20M	·3212	7·84732	1·161	**697**	4	Mr	28	·17	5	Ap	26	·70	7	My	26	·28	1 3	Je Jl	24○ 24	·76 ·29	4	Au	22	·82
3799	755	620	20M	·5798	26·48634	26·819	**698**	3	Ap	16	06	4	My	15	·59	6	Je	14○	·12	7	Jl	13	·65	2	Au	12	·19
3800	756	621	20M	·8385	15·59477	23·007	**699**	7	Ap	5	·43	1	My	4	·96	3	Je	3○	·49	5	Jl	3	·02	6	Au	1	·55
3801	757	622	20M	·0972	4·70321	19·164	**700**	4	Mr	24	·80	6	Ap	23	33	7 2	My Je	22● 21	·86 ·39	3	Jl	20	·92	5	Au	19	·45
3802	758	623	20M	·3559	23·34224	17·288	**701**	3	Ap	12○	·70	5	My	12	·23	6	Je	10	·76	1	Jl	10	·29	2	Au	8	·82
3803	759	624	20M	·6146	12·45066	13·456	**702**	1	Ap	2●○	07	2	My	1	·60	4	My	31	·18	5	Je	29	·66	7	Jl	29	·19
3804	760	625	20M	·8733	1·55910	9·614	**703**	5	Mr	22●	43	6 1	Ap My	20 20	·97 ·50	3	Je	19	·03	4	Jl	18	·56	6	Au	17	·09
3805	761	626	20M	·1319	20·19813	7·747	**704**	4	Ap	9	·33	5	My	8	·86	7	Je	7	·39	1	Jl	6	·92	3	Au	5○	·45
3806	762	627	20M	3906	9·80656	3·905	**705**	1	Mr	29	·70	3	Ap	28	·23	4	My	27	76	6	Je	26	·29	7	Jl	25●○	·82
3807	763	628	20M	·6493	27·94559	2·039	**706**	7	Ap	17	60	2	My	17	·13	3	Je	15	·66	5	Jl	15○	·19	6	Au	13	·72
3808	764	629	20M	9080	17·05408	25·751	**707**	4	Ap	6	96	6	My	6	·49	1	Je	5	08	3	Jl	4●	·56	4	Au	3	·09
3809	765	630	20M	·1667	6·16245	21·909	**708**	2	Mr	26	33	3	Ap	24	·86	5	My	24○	·39	6 1	Je Jl	22 22	·92 ·45	2	Au	20	·98
3810	766	631	20M	·4253	24·80148	20·043	**709**	1	Ap	14	28	2	My	13●○	76	4	Je	12	·29	5	Jl	11	·82	7	Au	10	·35
3811	767	632	20M	·6840	13·90992	16·201	**710**	5	Ap	3	·60	7	My	3○	13	1	Je	1	·66	3	Jl	1	19	4	Jl	30	·74
3812	768	633	20M	9427	30·19835	12·358	**711**	2	Mr	23○	·96	4	Ap	22	49	6 7	My Je	22 20	·02 ·55	2	Jl	20	·09	3	Au	18	·62
3813	769	634	20M	·2014	21·65738	10·492	**712**	1	Ap	10	86	3	My	10	39	4	Je	8	·92	6	Jl	8	·45	7	Au	6	·98
3814	770	635	20M	·4601	10·76581	6·650	**713**	6	Mr	31	·28	7	Ap	29	76	2	My	29	29	3	Je	27	·82	5	Jl	27	·35
3815	771	636	20M	·7187	29·40483	4·784	**714**	5	Ap	19	·13	6	My	18	·66	1	Je	17	19	2	Jl	16	72	4	Au	15●	·25
3816	772	637	20M	9774	18·51327	0·941	**715**	2	Ap	8	·49	4	My	8	·02	5	Je	6	55	7	Jl	6○	·08	1	Au	4●	·61
3817	773	638	20M	2861	7·62171	24·653	**716**	6	Mr	27	86	1	Ap	26	39	2	My	25	·92	4 5	Je Jl	24○ 23●	·45 ·98	7	Au	22	51
3818	774	639	20M	·4948	26·26073	22·788	**717**	5	Ap	15	·76	7	My	15	28	1	Je	13○	82	3	Jl	13	·35	4	Au	11	88
3819	775	640	20M	·7535	15·36907	18·945	**718**	3	Ap	5	·12	4	My	4	·65	6	Je	3	19	7	Jl	2	·72	2	Au	1	25
3820	776	641	21M	·0121	4·47760	15·103	**719**	7	Mr	25	49	2	Ap	24○	02	3 5	My Je	23● 22	55 08	6	Jl	21	·61	1	Au	20	·14
3821	777	642	20M	·2708	23·11662	13·237	**720**	6	Ap	12○	·39	7	My	11	92	2	Je	10	·45	3	Jl	9	·98	5	Au	8	·51
3822	778	643	20M	5295	12·22506	9·394	**721**	3	Ap	1	·76	5	My	1	29	6	My	30	·82	1	Je	29	35	2	Jl	28	·88
3823	779	644	20M	·7882	1·33350	5·552	**722**	1 2	Mr Ap	22 20	·12 ·65	4	My	20	·18	5	Je	18	·71	7	Jl	18	·25	1	Au	16○	·78
3824	780	645	21M	0469	19·97251	3·686	**723**	7	Ap	10	·02	1	My	9	55	3	Je	8	·08	4	Jl	7	·61	6	Au	6○	·14
3825	781	646	20M	·8055	9·08095	27·398	**724**	4	Mr	29	39	5	Ap	27	92	7	My	27	45	1	Je	25	·98	3 5	Jl Au	25●○ 24	51 ·04
3826	782	647	20M	5642	27·71998	25·532	**725**	3	Ap	17	·29	4	My	16	82	6	Je	15	·85	7	Jl	14●	·88	2	Au	13	·41
3827	783	648	20M	·8229	16·82841	21·690	**726**	7	Ap	6	·65	2	My	6	18	3	Je	4○	71	5	Jl	4●	·24	6	Au	2	·77
3828	784	649	21M	0816	5·93685	17·847	**727**	5	Mr	27	02	6	Ap	25	·55	1	My	25●○	·08	2 4	Je Jl	23 23	·61 ·14	5	Au	21	·67
3829	785	650	20M	·8403	24·57588	15·981	**728**	3	Ap	13	92	5	My	13○	45	6	Je	11	·98	1	Jl	11	51	3	Au	10	·04
3830	786	651	20M	·5990	13·68430	12·159	**729**	1	Ap	3○	28	2	My	2	·81	4	Je	1	·35	5	Je	30	·88	7	Jl	30	·41
3831	787	652	20M	8576	2·79274	8·296	**730**	5	Mr	23○	65	7 1	Ap My	22 21	·18 ·71	3	Je	20	·24	4	Jl	19	·77	6	Au	18	·30
3832	788	653	21M	·1168	21·43177	6·430	**731**	4	Ap	11	55	6	My	11	·08	7	Je	9	·61	2	Jl	9	14	3	Au	7	·67
3833	789	654	20M	3749	10·54020	2·588	**732**	1	Mr	30	92	3	Ap	29	·45	4	My	28	·98	6	Je	27	51	1	Jl	27	·04
3834	790	655	20M	6337	29·17923	0·722	**733**	7	Ap	18	·81	2	My	18	·34	3	Je	16	·87	5	Jl	16○	·41	6	Au	14●	·94
3835	791	656	20M	·8924	18·28767	24·484	**734**	5	Ap	8	·18	6	My	7	·71	1	Je	6	24	2	Jl	5○	·77	4	Au	4	·30
3836	792	657	21M	·1510	7·39609	20·592	**735**	2	Mr	28	55	4	Ap	27	·08	5	My	26	·61	7 1	Je Jl	25●○ 24	·14 ·67	3	Au	23	·20
3837	793	658	20M	·4097	26·03512	18·725	**736**	1	Ap	15	·45	2	My	14	·98	4	Je	13	51	6	Jl	13	·04	7	Au	11	·57
3838	794	659	20M	6684	15·14356	14·883	**737**	5	Ap	4	·81	7	My	4○	·34	1	Je	2	87	3	Jl	2	·40	4	Jl	31	·94
3839	795	660	20M	·9271	4·25229	11·042	**738**	3	Mr	25	·18	4	Ap	23○	·71	6 7	My Je	23 21	·24 77	2	Jl	21	30	3	Au	19	·83
3840	796	661	21M	1858	22·89101	9·175	**739**	2	Ap	13	·08	3	My	12	61	5	Je	11	14	6	Jl	10	·67	1	Au	9	·20

* For Sūrya siddhānta figures for A.D. 500 to

Ending moments of tithis are the same for Ārya and Sūrya siddhāntas

from A.D. 500 to A.D. 999 (Ārya siddhānta)*—cont.

Aśvina. Week-day.	Month.	Day.	Fraction.	Kārttika. Week-day.	Month.	Day.	Fraction	Mārgaśīrsha. Week-day.	Month.	Day.	Fraction.	Pausha. Week-day.	Month.	Day.	Fraction.
2	Au	31	·92	4	S	30	·45	5	O	29	·98	7	N	28	·51
1	S	19	·82	3	O	19	·85	4	N	17○	·88	6	D	17	·41
6	S	9	·19	7	O	8	72	2	N	7○	·75	3	D	6	·78
3	Au	29	·55	5	S	28	·09	6	O	27○	·62	1	N	26	·15
2	S	16	·45	4	O	15	·98	5	N	14	·51	7	D	14	·04
6	S	5○	·82	1	O	5●	·85	2	N	3	·88	4	D	3	·41
4	Au	26○	·19	5	S	24	·72	7	O	24	·25	1	N	22	78
3	S	14	80	4	O	13	·61	6	N	12	15	7	D	11	·68
7	S	2	·45	1	O	1	·98	3	O	31	·51	5	N	30	·04
6	S	21	·35	7	O	20	·88	2	N	19	·41	3	D	18○	·94
3	S	10	·72	5	O	10	25	6	N	8	·78	1	D	8●○	31
1	Au	31	·08	2	S	29	·61	4	O	29	·14	5	N	27●	·67
6	S	17	·98	1	O	17○	·51	3	N	16	·04	4	D	15	·57
4	S	7	·35	5	O	6○	·88	7	N	5	·41	1	D	4	·94
1	Au	27	·72	3	S	26●○	·25	4	O	25	·78	6	N	24	·31
7	S	15	·62	2	O	15	·15	3	N	13	·68	5	D	13	21
4	S	3●	·99	6	O	3	·52	1	N	2	·05	2	D	1	·58
{2	Au	24	·35	5	O	22	42	6	N	20	·94	1	D	20	·47
{3	S	22	·88												
1	S	12	·25	2	O	11	·78	4	N	10	·31	5	D	9	·84
5	S	1	·62	7	O	1	·15	1	O	30	·68	3	N	29○	·21
4	S	19	·51	6	O	19	·05	7	N	17○	·58	2	D	17	·11
1	S	8	·88	3	O	8	·41	4	N	6○	·94	6	D	6	·47
6	Au	29	·25	7	S	27	·78	2	O	27●	·31	3	N	25	·84
5	S	17	·15	6	O	16	·68	1	N	15	·21	2	D	14	·74
2	S	5○	·52	4	O	5●	·04	5	N	3	·57	7	D	3	·11
6	Au	25○	·88	1	S	24	·41	2	O	23	·94	4	N	22	·47
5	S	13	·78	7	O	13	·31	1	N	11	·84	3	D	11	·37
3	S	3	·15	4	O	2	·68	6	N	1	·21	7	N	30	·74
2	S	21	·04	3	O	20	·57	5	N	19	·10	6	D	18○	·63
6	S	10	·41	7	O	9	·94	2	N	8	·47	4	D	8	·00
3	Au	30	·78	5	S	29	·31	6	O	28○	·84	1	N	27	·37
2	S	18	·67	4	O	18○	·21	5	N	16	·74	7	D	16	·27
7	S	7	·04	1	O	6○	·57	3	N	5	·10	4	D	4	·63
4	Au	27	·41	5	S	25●	·94	7	O	25	·47	2	N	24	·00
3	S	15	·31	4	O	14	·84	6	N	13	·37	7	D	12	·90
7	S	4	·67	2	O	4	·20	3	N	2	·73	5	D	2	·27
6	S	22	·57	1	O	22	·10	2	N	20	·63	4	D	20	·16
3	S	11	·94	5	O	11	·47	7	N	10	·00	1	D	9○	·53
1	S	1	·31	2	S	30	·84	4	O	30	·87	5	N	28○	·90
7	S	20	·20	1	O	19	·78	3	N	18○	·26	4	D	17	·79
4	S	8	·57	6	O	8	·10	7	N	6●	·63	2	D	6	·16
1	Au	28	·94	3	S	27	·47	5	O	27●	·00	6	N	25	·53
7	S	16○	·88	2	O	16	·37	3	N	14	·90	5	D	14	·43
5	S	6○	·20	6	O	5	·73	1	N	4	·26	2	D	3	·79
2	Au	25●	·57	4	S	24	·10	5	O	23	·63	7	N	22	·16
1	S	13	·47	3	O	13	·00	4	N	11	·53	6	D	11	·06
5	S	2	·83	7	O	2	·36	1	O	31	·89	3	N	30	·43
4	S	21	·73	6	O	21	·26	7	N	19	·79	2	D	19●	·33
2	S	10	·10	3	O	9	·63	5	N	8○	·15	6	D	7	·69
6	Au	30	·47	1	S	29	·00	2	O	28●○	·55	4	N	27	·06
5	S	18	·36	6	O	17○	·89	1	N	16	·42	2	D	15	·95
2	S	7	·73	4	O	7	·26	5	N	5	·79	7	D	5	·82

A.D.	Māgha. Week-day.	Month.	Day.	Fraction.	A.D.	Phālguna. Week-day.	Month.	Day.	Fraction	Chaitra. Week-day.	Month.	Day.	Fraction.
	2	D	28	·05	**89**	3	Jr	26	·58	5	F	25	·11
90	7	Jr	15	·94		2	F	14	·47	4	Mr	16	·00
91	5	Jr	5	·31		6	F	3	·84	1	Mr	5	·37
	2	D	25	·68	**92**	4	Jr	24	·21	5	F	22	·74
93	1	Jr	12	·57		3	F	11	·11	4	Mr	12○	·64
94	5	Jr	1	·94		7	Jr	31	·47	2	Mr	2○	·00
	3	D	22	·31	**95**	4	Jr	20	·84	{6	F	19●○	37
										{7	Mr	20	·90
96	2	Jr	10	·21		3	F	8	·74	5	Mr	9	·27
	6	D	29○	·57	**97**	1	Jr	28●	·10	2	F	26	·68
98	5	Jr	17	·47		7	F	16	·00	1	Mr	17	·58
99	2	Jr	6	·84		4	F	5	·87	5	Mr	6	·90
	7	D	27	·21	**700**	1	Jr	25	74	3	F	24	·27
01	6	Jr	14	·11		7	F	12	64	2	Mr	14	·17
02	3	Jr	3	·47		5	F	2	·01	6	Mr	3	·54
	7	D	23	·84	**03**	2	Jr	22	·37	3	F	20	·90
04	6	Jr	11	·74		1	F	10○	·27	2	Mr	10	·80
	4	D	31	·11	**05**	5	Jr	29○	·64	7	F	28●	·17
06	3	Jr	19●○	·01		4	F	17	·54	6	Mr	19	·07
07	7	Jr	8	·87		1	F	6	·90	3	Mr	8	·48
	4	D	28●	·74	**08**	6	Jr	27	27	7	F	25	·80
09	3	Jr	15	·64		5	F	14	·17	6	Mr	15	·70
10	1	Jr	5	·00		2	F	3	·53	4	Mr	5	·07
	5	D	25	·87	**11**	6	Jr	23	·90	1	F	22	·43
12	4	Jr	13	·27		5	F	11	·80	7	Mr	12○	·33
13	1	Jr	1	·64		3	Jr	31	·17	4	Mr	1○	70
	6	D	22	·00	**14**	7	Jr	20	·58	{2	F	19●	·06
										{3	Mr	20	·59
15	4	Jr	9○	·90		6	F	8	·43	7	Mr	9	·96
	2	D	30○	·27	**16**	3	Jr	28	·80	5	F	27	·33
17	1	Jr	17	·17		2	F	15	·70	4	Mr	17	·23
18	5	Jr	6	·53		7	F	5	·06	1	Mr	6	·59
	2	D	26	·90	**19**	4	Jr	25	·43	5	F	23	·96
20	1	Jr	14	·80		3	F	13	33	4	Mr	13	·86
21	6	Jr	3	·16		7	F	1	·69	2	Mr	3	·23
	3	D	23	·53	**22**	5	Jr	22	·06	6	F	20○	·59
23	2	Jr	11	·43		3	F	9○	·96	5	Mr	11	·49
	6	D	31	·80	**24**	1	Jr	30○	·33	2	F	28	·86
25	5	Jr	18●	·69		7	F	17	·22	1	Mr	18	·75
26	3	Je	8●	·06		4	F	6	59	6	Mr	8	·13
	7	D	28●	·43	**27**	1	Jr	26	·96	3	F	25	·49
28	6	Jr	16	·33		7	F	14	·86	2	Mr	15	·39
29	3	Jr	4	·69		5	F	3	·22	6	Mr	4	·75
	1	D	25	·06	**30**	2	Jr	23	·59	4	F	22	·12
31	6	Jr	12	·96		1	F	11	·49	3	Mr	13○	·02
32	4	Jr	2	·32		5	Jr	31	·85	7	Mr	1	·39
	1	D	21	·69	**33**	3	Jr	20○	·22	{4	F	18	·75
										{6	Mr	20	·28
34	7	Jr	9○	·59		2	F	8	·12	3	Mr	9	·65
	4	D	29●○	·96	**35**	6	Jr	28	·49	1	F	27	·02
36	3	Jr	17	·85		5	F	16	·88	6	Mr	16	·91
37	1	Jr	6	·22		2	F	4	·75	4	Mr	6	·28
	5	D	26	·59	**38**	7	Jr	25	·12	1	F	23	·65
39	4	Jr	14	·49		6	F	13	·02	7	Mr	14	·55
40	1	Jr	3	·85		3	F	2	·38	4	Mr	2○	·91

A.D. 999 see pages 238 to 241 below.

For tithis by Brahma siddhānta add algebraically −·03 to the above.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Month and day A.D.	Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era.	Vaiśākha.				Jyeshṭha.				Āshāḍha.				Śrāvaṇa.				Bhādrapada.			
			Commencement of solar year.				A.D.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
3841	797	662	20M	4444	11 99945	5 333	**740**	6	Ap	1●	44	7	Ap	30	·97	2	My	30	·51	4	Je	29	04	5	Jl	28	·57
3842	798	663	20M	·7031	1 10788	1 490	**741**	3 5	Mr Ap	21 20	81 ·34	6	My	19	·87	1	Je	18	·41	2	Jl	17	93	4	Au	16○	·46
3843	799	664	20M	·9618	19·74691	27 179	**742**	2	Ap	9	·71	4	My	9	24	5	Je	7	·77	7	Jl	7	·30	1	Au	5●○	83
3844	800	665	21M	·2205	8·85525	23 337	**743**	7	Mr	30	·08	1	Ap	28	·61	3	My	28	·14	4	Je	26	·67	6 7	Jl Au	26 24	·20 ·78
3845	801	666	20M	·4792	27 49437	21·470	**744**	5	Ap	16	·97	7	My	16	·50	2	Je	15○	·03	3	Jl	14	·57	5	Au	13	10
3846	802	667	20M	·7878	16·60280	17·629	**745**	3	Ap	6	·34	4	My	5	·87	6	Je	4○	·40	7	Jl	3	·93	2	Au	2	·46
3847	803	668	20M	·9995	5·71124	13·786	**746**	7	Mr	26	·71	2	Ap	25	·24	3	My	24●○	·78	5 6	Je Jl	28 22	·30 ·83	1	Au	21	·36
3848	804	669	21M	·2552	24·35026	11·920	**747**	6	Ap	14○	·61	1	My	14●	·14	2	Je	12	·67	4	Jl	12	·20	5	Au	10	·73
3849	805	670	20M	·5132	13·45870	8·077	**748**	3	Ap	2○	·97	5	My	2	·50	7	Je	1	·03	1	Je	30	·56	3	Jl	30	·09
3850	806	671	20M	·7726	2·56714	4·285	**749**	1	Mr	23●○	·34	2 4	Ap My	21 21	·87 40	5	Je	19	93	7	Jl	19	·46	1	Au	17	·99
3851	807	672	21M	·0312	21·20615	2·369	**750**	7	Ap	11	·24	1	My	10	·77	3	Je	9	·30	4	Jl	8	·83	6	Au	7	·36
3852	808	673	21M	·2899	10·31459	26·081	**751**	4	Mr	31	·60	6	Ap	30	·13	7	My	29	·67	2	Je	28	·20	3	Jl	27○	·73
3853	809	674	20M	·5486	28·95362	24·215	**752**	3	Ap	18	·50	5	My	18	·03	6	Je	16	·56	1	Jl	16○	·09	2	Au	14	·62
3154	810	675	20M	·8073	18·06205	20·873	**753**	7	Ap	7	·87	2	My	7	·40	3	Je	5	·93	5	Jl	5○	·46	6	Au	3	·99
3855	811	676	21M	·0660	7·17049	16·530	**754**	5	Mr	28	·24	6	Ap	26	·77	1	My	26	·30	2 4	Je Jl	24● 24	83 ·36	5	Au	22	·89
3856	812	677	21M	·3246	25·80951	14·664	**755**	4	Ap	16	·13	5	My	15○	·66	7	Je	14	·19	1	Jl	13	·73	3	Au	12	·26
3857	813	678	20M	·5833	14·91795	10·822	**756**	1	Ap	4	·50	3	My	4○	·03	4	Je	2	·56	6	Jl	2	·09	7	Jl	31	·62
3858	814	679	20M	·8420	4·02638	6·980	**757**	5	Mr	24	·87	7	Ap	23●	·40	1 3	My Je	22 21	·93 ·44	4	Jl	20	·99	6	Au	19	·52
3859	815	680	21M	·1007	22·66534	5·113	**758**	4	Ap	12	·77	6	My	12	·30	7	Je	10	·83	2	Jl	10	·36	3	Au	8	·89
3860	816	681	21M	·3594	11·77445	1·272	**759**	2	Ap	2●	·13	3	My	1	·66	5	My	31	19	6	Je	29	·72	1	Jl	29	·25
3861	817	682	20M	·6180	0·88228	24·983	**760**	6 1	Mr Ap	21 20	·50 ·03	2	My	19	·56	4	Je	18	·09	5	Jl	17	·62	7	Au	16○	·15
3862	818	683	20M	·8767	19·52131	23·117	**761**	5	Ap	9	·40	6	My	8	·93	1	Je	7	·46	2	Jl	6	·99	4	Au	5●	·52
3863	819	684	21M	·1354	8·62974	19·275	**762**	2	Mr	29	·77	4	Ap	28	·30	5	My	27	·83	7	Je	26○	·36	1 3	Jl Au	25 24	·89 ·42
3864	820	685	21M	·3941	27·26876	17·409	**763**	1	Ap	17	·67	3	My	17	·20	4	Je	15○	·73	6	Jl	15	·26	7	Au	13	·79
3865	821	686	20M	·6528	16·37720	13·566	**764**	6	Ap	6	·03	7	My	5	·56	2	Je	4●○	·09	3	Jl	3	·62	5	Au	2	·15
3866	822	687	20M	·9114	5·48564	9·724	**765**	3	Mr	26	·40	4	Ap	24○	·93	6	My	24	·46	7 2	Je Jl	22 22	·99 ·52	4	Au	21	·05
3867	823	688	21M	·1701	24·12465	7·858	**766**	2	Ap	14○	·30	3	My	13	·83	5	Je	12	·36	6	Jl	11	·89	1	Au	10	·42
3868	824	689	21M	·4288	13·23310	4·016	**767**	6	Ap	3●○	·66	1	My	3	·19	2	Je	1	·73	4	Jl	1	·26	5	Jl	30	·79
3869	825	690	20M	·6875	2·34153	0·178	**768**	4	Mr	23●	·02	6 7	Ap My	21 21	·56 ·09	1	Je	19	·62	3	Jl	19	·15	4	Au	17	68
3870	826	691	20M	·9362	20·98055	25·862	**769**	2	Ap	10	·93	4	My	10	·46	5	Je	8	·99	7	Jl	8	·52	2	Au	7○	·05
3871	827	692	21M	·2049	10·08899	22·019	**770**	7	Mr	31	·30	1	Ap	29	·83	3	My	29	·36	4	Je	27	·89	2	Jl	27○	·42
3872	828	693	21M	·4635	28·72811	20·153	**771**	6	Ap	19	·19	7	My	18	·72	2	Je	17	·25	3	Jl	16○	·79	5	Au	15	·32
3873	829	694	20M	·7222	17·83644	16·311	**772**	3	Ap	7	·56	5	My	7	·09	6	Je	5	·62	1	Jl	5●	·15	2	Au	3	·68
3874	830	695	20M	9809	6·94488	12·489	**773**	7	Mr	27	·93	2	Ap	26	·46	3	My	25○	·99	5 7	Je Jl	24 24	·52 ·05	1	Au	22	·58
3875	831	696	21M	·2396	25·58891	10·602	**774**	6	Ap	15	·83	1	My	15○	·36	2	Je	13	·89	4	Jl	13	·42	5	Au	11	·95
3876	832	697	21M	·4988	14·69234	6·760	**775**	4	Ap	5	·19	5	My	4●○	·72	7	Je	3	·25	1	Jl	2	·78	3	Au	1	·31
3877	833	698	20M	·7569	3·80077	2·912	**776**	1	Mr	24○	·56	3	Ap	23	·09	4 6	My Je	22 21	·62 ·15	7	Jl	20	·68	2	Au	19	·21
3878	834	699	21M	·0156	22·43980	1·052	**777**	7	Ap	12	·46	1	My	11	·99	3	Je	10	·52	5	Jl	10	·05	6	Au	8	·58
3879	835	700	21M	·2743	11·54823	24·764	**778**	4	Ap	1	·82	6	My	1	·35	7	My	30	·88	2	Je	29	·42	3	Jl	28	·95
3880	836	701	21M	·5330	0·65667	20·922	**779**	2 3	Mr Ap	22 20	·19 ·72	5	My	20	·25	6	Je	18	·78	1	Jl	18	·31	2	Au	16●	·84
3881	837	702	20M	·7917	19·29570	19·055	**780**	1	Ap	9	·09	2	My	8	·62	4	Je	7	·15	5	Jl	6○	·68	7	Au	5●	·21
3882	838	703	21M	·0503	8·40413	15·213	**781**	5	Mr	29	·46	6	Ap	27	·99	1	My	27	·52	3	Je	26●○	05	4 6	Jl Au	25 24	·58 ·11
3883	839	704	21M	·3090	27·04315	13·347	**782**	4	Ap	17	·35	5	My	16	·88	7	Je	15○	41	1	Jl	14	·95	3	Au	13	·48
3884	840	705	21M	·5677	16·15159	9·505	**783**	1	Ap	6	·72	3	My	6	25	4	Je	4	·78	6	Jl	4	·31	7	Au	2	·84
3885	841	706	20M	·8264	5·26002	5·662	**784**	6	Mr	26	·09	7	Ap	24○	·62	2 3	My Je	24 22	·15 ·68	5	Jl	22	·21	6	Au	20	·74
3886	842	707	21M	·0851	23·89905	3·796	**785**	4	Ap	13○	·99	6	My	13	·52	1	Je	12	·05	2	Jl	11	·58	4	Au	10	·11
3887	843	708	21M	·3437	13·00749	27·508	**786**	2	Ap	3●	·35	3	My	2	·88	5	Je	1	·41	6	Je	30	·94	1	Jl	30	·47
3888	844	709	21M	·6024	2 11591	23·666	**787**	6	Mr	23●	·72	1 2	Ap My	22 21	·25 ·78	4	Je	20	·31	5	Jl	19	·84	7	Au	18○	·37
3889	845	710	20M	·8611	20·75494	21·800	**788**	5	Ap	10	·62	7	My	10	·15	1	Je	8	·68	3	Jl	8	·21	4	Au	6○	·74
3890	846	711	21M	·1198	9·86333	17·958	**789**	2	Mr	30	·98	4	Ap	29	·51	6	My	29	·05	7	Je	27	·58	2	Jl	27●○	·11
3891	847	712	21M	·3785	28·50240	16·091	**790**	1	Ap	18	·88	3	My	18	·41	4	Je	16	·94	6	Jl	16	·47	1	Au	15	·00
3892	848	713	21M	·6371	17·61084	12·249	**791**	6	Ap	8	·25	7	My	7	·78	2	Je	6○	·31	3	Jl	5●	·84	5	Au	4	·37
3893	849	714	20M	·8958	6·71928	8·407	**792**	3	Mr	27	·62	5	Ap	26	·15	6	My	25○	·68	1 2	Je Jl	24 23	·21 ·74	4	Au	22	·27
3894	850	715	21M	·1545	25·55829	6·541	**793**	2	Ap	15	·51	4	My	15○	·04	5	Je	13	·57	7	Jl	13	·11	1	Au	11	·64
3895	851	716	21M	·4132	14·46673	2·698	**794**	6	Ap	4	·88	1	My	4●	·41	2	Je	2	·94	4	Jl	2	·47	6	Au	1	·00

from A.D. 500 to A.D. 999 (Ārya siddhānta)*—cont.

Āśvina. Week-day.	Month.	Day.	Fraction.	Kārttika. Week-day.	Month.	Day.	Fraction.	Mārgaśīrsha. Week-day.	Month.	Day.	Fraction.	Pausha. Week-day.	Month.	Day.	Fraction.	A.D.	Māgha. Week-day.	Month.	Day.	Fraction.	A.D	Phālguna. Week-day.	Month.	Day.	Fraction.	Chaitra. Week-day.	Month.	Day.	Fraction.
7	Au	27○	·10	1	S	25	·63	3	O	25	·16	4	N	23	·69		6	D	28	·22	**41**	7	Jr	21	·75	2	F	20○	·28
5	S	14	·99	7	O	14	·53	2	N	13	·06	3	D	12	·59	**42**	5	Jr	11	·12		6	F	9○	65	1	Mr	11	·18
3	S	4	·36	4	O	3	·89	6	N	2	·42	7	D	1	·95		2	D	31	·48	**43**	4	Jr	30	·01	5	F	28	·55
2	S	23	·26	3	O	22	·79	5	N	21	·32	6	D	20○	·85	**44**	1	Jr	19	·38		2	F	17	.91	4	Mr	18	·44
6	S	11	·63	1	O	11	·16	2	N	9	·69	4	D	9○	·22	**45**	5	Jr	7	·75		7	F	6	·28	1	Mr	7	·81
3	Au	31	.99	5	S	30	·52	7	O	30	·05	1	N	28○	·59		3	D	28	·12	**46**	4	Jr	26	·65	6	F	25	·18
2	S	19	.89	4	O	19	·42	5	N	17	95	7	D	17	·48	**47**	2	Jr	16	·01		3	F	14	54	5	Mr	16	·07
7	S	9	·26	1	O	8	·79	3	N	7●	·32	4	D	6	·85	**48**	6	Jr	5	·38		7	F	3	·98	2	Mr	4	44
4	Au	28	·63	6	S	27○	16	7	O	26	·69	2	N	25	·22		3	D	24	·75	**49**	5	Jr	23	·28	6	F	21	·81
3	S	16○	·52	5	O	16	·05	6	N	14	58	1	D	14	·11	**50**	2	Jr	12	·64		4	F	11	·18	5	Mr	12	·71
7	S	5	·89	2	O	5	·42	3	N	3	·96	5	D	3	·48	**51**	7	Jr	2	·01		1	Jr	31○	·54	3	Mr	2	·07
5	Au	26	·26	{6	S	24	·79	**Mārgaśīrsha Kshaya**				2	N	22	·85		4	D	22	·38	**52**	5	Jr	20○	91	{7	F	19	·44
				{1	O	24	·32																			{1	Mr	19	·97
4	S	13	·15	5	O	12	·69	7	N	11	·22	1	D	10	·75	**53**	3	Jr	9●○	·28		4	F	7	·81	6	Mr	9	·34
1	S	2	·52	3	O	2	·05	4	O	31	·58	6	N	30	·11		7	D	29●	·64	**54**	2	Jr	28	·17	3	F	26	·71
7	S	21	·42	1	O	20	·95	3	N	19○	·43	5	D	19	·01	**55**	6	Jr	17	·54		1	F	16	.07	2	Mr	17	60
4	S	10	·79	6	O	10	·32	7	N	8○	·85	2	D	8	·38	**56**	3	Jr	6	·91		5	F	5	·44	6	Mr	5	·97
2	Au	30	·15	3	S	28	·68	5	O	28●○	·21	6	N	26	·75		1	D	26	·28	**57**	2	Jr	24	·81	4	F	23	·34
1	S	18	·05	2	O	17	·58	4	N	16	·11	5	D	15	·64	**58**	7	Jr	14	·17		1	F	12	·70	3	Mr	14○	·78
5	S	7○	·42	6	O	6●	·95	1	N	5	·48	3	D	5	·01	**59**	4	Jr	3	·54		6	F	2	·07	7	Mr	3○	·60
2	Au	27○	·79	4	S	26	32	5	O	25	·85	7	N	24	·38		1	D	23	·91	**60**	3	Jr	22	·44	[illegible]	[illegible]	20○	·97
1	S	14	·68	3	O	14	·21	4	N	12	·74	6	D	12	·27	**61**	7	Jr	10	·81		2	F	9	·34	3	Mr	10	·87
6	S	4	·05	7	O	3	·58	2	N	2	·11	3	D	1	·64		5	D	31○	·18	**62**	6	Jr	29●	·71	1	F	28	·24
4	S	22	·95	6	O	22	·48	1	N	21	·01	2	D	20○	·54	**63**	4	Jr	19●	·07		5	F	17	·60	7	Mr	19	·18
2	S	12	·32	3	O	11	·85	5	N	10	·38	6	D	9○	·91	**64**	1	Jr	8	·44		2	F	6	·97	4	Mr	7	·50
6	Au	31	·69	1	S	30	·22	2	O	29	·75	4	N	28●	·28		5	D	27	·81	**65**	7	Jr	26	·34	1	F	24	·87
5	S	19	·58	7	O	19	·11	1	N	17	·64	3	D	17	·17	**66**	4	Jr	15	·71		6	F	14	24	7	Mr	15	·77
2	S	8	·95	4	O	8○	·48	6	N	7●	·01	7	D	6	·54	**67**	2	Jr	5	·07		3	F	3	·60	5	Mr	5	·13
7	Au	29	·32	1	S	27○	·85	3	O	27	·88	4	N	25	·91		6	D	25	·44	**68**	7	Jr	23	·97	2	F	22	·50
6	S	16	·25	7	O	15	·75	2	N	14	·28	3	D	13	·81	**69**	5	Jr	12	·34		6	F	10○	·87	1	Mr	12	·40
3	S	5●	·58	5	O	5	·11	6	N	3	·64	1	D	3	·17	**70**	2	Jr	1	·70		4	Jr	31○	·28	5	Mr	1	·77
{7	Au	25●	·95	4	O	24	.01	5	N	22	·64	**Pausha Kshaya**					7	D	22	·07	**71**	1	Jr	20○	·60	{3	F	19	·13
{2	S	24	·48																							{4	Mr	20	·66
6	S	13	·85	1	O	13	·38	2	N	11	·91	4	D	11	·44	**72**	5	Jr	9	·97		7	F	8	·50	2	Mr	9	·03
4	S	2	·21	5	O	1	·74	6	O	31	·27	1	N	29○	·81		3	D	29●	·34	**73**	4	Jr	27	·87	6	F	26	·40
3	S	21	·11	5	O	20	·64	9	N	19○	·17	7	D	18	·70	**74**	2	Jr	17	·23		3	F	15	·76	5	Mr	17	·29
7	S	10	·48	2	O	10	·01	3	N	8○	·54	5	D	8	·07	**75**	6	Jr	6	·60		1	F	5	·13	2	Mr	6	·66
4	Au	30	·85	6	S	29	·38	7	O	28●	·91	2	N	27	·44		3	D	26	·97	**76**	5	Jr	25	·50	7	F	24	·03
3	S	17○	·74	5	O	17	·27	6	N	15	·60	1	D	15	·33	**77**	2	Jr	13	·87		4	F	12	·40	5	Mr	13○	·93
1	S	7○	·11	2	O	6	·64	4	N	5	·17	5	D	4	·70	**78**	7	Jr	3	·23		1	F	1	·76	3	Mr	3○	·29
5	Au	27○	·48	7	S	26	·01	1	O	25	·54	3	N	24	·07		4	D	23	·60	**79**	6	Jr	22	·13	7	F	20●	·66
4	S	15	·37	5	O	14	·91	7	N	13	·44	1	D	12	·97	**80**	3	Jr	11○	·50		5	F	10●	·03	6	Mr	10	·56
1	S	3	·74	3	O	3	·27	4	N	1	·80	6	D	1	·33		7	D	30○	·86	**81**	2	Jr	29	·39	3	F	27	·92
7	S	22	·64	2	O	22	·17	3	N	20	·70	5	D	20○	·28	**82**	6	Jr	18	·76		1	F	17	·29	2	Mr	18	·82
5	S	12	·01	6	O	11	·54	1	N	10	·07	2	D	9●	·60	**83**	4	Jr	8	·18		5	F	6	·66	7	Mr	8	·19
2	S	1	·37	3	S	30	·90	5	O	30	48	6	N	28●	·97		1	D	28	·50	**84**	3	Jr	27	·03	4	F	25	·56
1	S	19	·27	2	O	18○	·80	4	N	17	·33	5	D	16	·86	**85**	7	Jr	15	·39		1	F	13	·92	3	Mr	15	·45
5	S	8	·64	7	O	8○	·17	1	N	6	·70	3	D	6	·28	**86**	4	Jr	4	·76		6	F	3	·29	7	Mr	4	·82
3	Au	29	·01	4	S	27●	·54	6	O	27	·07	7	N	25	·60		2	D	25	·18	**87**	3	Jr	23	·66	5	F	22○	·19
1	S	16●	·90	3	O	16	·43	4	N	14	·96	6	D	14	·49	**88**	1	Jr	13	·08		2	F	11○	·56	4	Mr	12	·09
6	S	5	·27	7	O	4	·80	2	N	3	·33	3	D	2	·86	**89**	5	Jr	1	·39		6	Jr	30●○	·92	1	Mr	1	·45
{3	Au	25	·64	6	O	23	·70	1	N	22	·23	2	D	21	·76	**90**	4	Jr	20●	·29		5	F	18	·82	7	Mr	20	·35
{5	S	24	·17																										
2	S	13	·53	4	O	13	·07	5	N	11	·60	7	D	11○	·13	**91**	1	Jr	9●	·66		3	F	8	·19	4	Mr	9	·72
6	S	2	·90	1	O	2	·43	2	O	31	·96	4	N	30○	·49		6	D	30	·02	**92**	7	Jr	28	·55	2	F	27	·09
5	S	20	·80	7	O	20	·33	1	N	18●○	·86	3	D	18	·39	**93**	4	Jr	16	·92		6	F	15	·45	7	Mr	16	·98
3	S	10	·17	4	O	9	·70	6	N	8	·23	7	D	7	·76	**94**	2	Jr	6	·29		3	F	4	·82	5	Mr	6	·85
7	Au	30	·53	2	S	29○	·06	3	O	28	·59	5	N	27	·13		6	D	26	·66	**95**	1	Jr	25	·19	2	F	23	·72

to A.D. 999 see pages 238 to 241 below.
For tithis by Brahma siddhānta add algebraically —·04 to the above.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly or first new moon.	Christian era.	Vaiśākha. Week-day.	Month	Day.	Fraction.	Jyeshṭha. Week-day.	Month.	Day.	Fraction.	Āshāḍha. Week-day.	Month.	Day.	Fraction.	Śrāvaṇa. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day.	Month.	Day.	Fraction.
							A.D.																				
3896	852	717	21M	·6719	3·57448	26·410	**795**	4	Mr	25○	·25	5	Ap	28	·78	7 1	My Je	23 21	·81 ·84	3	Jl	21	·37	4	Au	19	·90
3897	853	718	20M	·9305	22·21419	24·544	**796**	3	Ap	12	·15	4	My	11	·68	6	Je	10	·21	7	Jl	9	·74	2	Au	8	·27
3898	854	719	21M	·1892	11·32263	20·702	**797**	7	Ap	1	·51	2	My	1	·04	3	My	30	·57	5	Je	29	·10	6	Jl	28	·63
3899	855	720	21M	·4179	0·43106	16·860	**798**	4 6	Mr Ap	21 20	·88 ·41	7	My	19	·94	2	Je	18	·47	4	Jl	18○	·00	5	Au	16	·53
3900	856	721	21M	·7066	19·07008	14·993	**799**	3	Ap	9	·78	5	My	9	·31	6	Je	7	·84	1	Jl	7○	·37	2	Au	5	·90
3901	857	722	20M	9653	8·17852	11·151	**800**	1	Mr	29	·15	2	Ap	27	·68	4	My	27	·21	5	Je	25●○	·74	7 1	Jl Au	25 23	·27 ·80
3902	858	723	21M	·2240	26·81755	9·285	**801**	7	Ap	17	·04	1	My	16	·57	3	Je	15●	·11	4	Jl	14	·64	6	Au	13	·17
3903	859	724	21M	·4826	15·92587	5·443	**802**	4	Ap	6	·41	5	My	5○	·94	7	Je	4●	·47	2	Jl	4	·00	3	Au	2	·53
3904	860	725	21M	·7413	5·03441	1·601	**803**	1	Mr	26	·78	3	Ap	25●○	·31	4 6	My Je	24 23	·84 ·37	7	Jl	22	·90	2	Au	21	·43
3905	861	726	21M	·0000	23·67344	27·289	**804**	7	Ap	13	·68	2	My	13	·21	3	Je	11	·74	5	Jl	11	·27	6	Au	9	·80
3906	862	727	21M	·2587	12·78187	23·447	**805**	5	Ap	3	·04	6	My	2	57	1	Je	1	·10	2	Je	30	·63	4	Jl	30	·17
3907	863	728	21M	·5174	1·89031	19·604	**806**	2	Mr	28	·41	3 5	Ap My	21 21	94 ·47	7	Je	20	·00	1	Jl	19	·53	3	Au	18○	·06
3908	864	729	21M	·7760	20·52934	17·738	**807**	1	Ap	11	·31	2	My	10	·84	4	Je	9	·37	5	Jl	8	·90	7	Au	7○	·43
3909	865	730	21M	·0347	9·63776	13·896	**808**	5	Mr	30	·67	7	Ap	29	·21	1	My	28	·74	3	Je	27	·27	4	Jl	26●	·80
3910	866	731	21M	·2934	28·27679	12·030	**809**	4	Ap	18	·57	6	My	18	·10	7	Je	16○	·63	2	Jl	16●	·16	3	Au	14	·69
3911	867	732	21M	·5521	17·38523	8·187	**810**	1	Ap	7	·94	3	My	7	·47	5	Je	6○	00	6	Jl	5	·53	1	Au	4	·06
3912	868	733	21M	8108	6·49366	4·345	**811**	6	Mr	28	·31	7	Ap	26	·84	2	My	26○	·37	3 5	Je Jl	24 24	·90 ·43	6	Au	22	·96
3913	869	734	21M	·0694	25·13269	2·479	**812**	5	Ap	15	·20	6	My	14●	·73	1	Je	13	·27	2	Jl	12	·80	4	Au	11	·33
3914	870	735	21M	·3281	14·24112	26·191	**813**	2	Ap	4○	·57	4	My	4●	·10	5	Je	2	·63	7	Jl	2	·16	1	Jl	31	·69
3915	871	736	21M	·5868	3·34955	22·349	**814**	6	Mr	24●○	94	1	Ap	23	·47	3 4	My Je	23 21	·00 ·53	6	Jl	21	·06	7	Au	19	·59
3916	872	737	21M	·8455	21·98858	20·483	**815**	5	Ap	12	·84	7	My	12	·37	1	Je	10	·90	3	Jl	10	·43	4	Au	8	·96
3917	873	738	21M	·1042	11·09702	16·640	**816**	3	Ap	1	·20	4	Ap	30	·73	6	My	30	·26	7	Je	28	·79	2	Jl	28	·33
3918	874	739	21M	·3628	0·20545	12·799	**817**	7 2	Mr Ap	21 20	·57 ·10	3	My	19	·63	5	Je	18	·16	6	Jl	17○	·69	1	Au	16	·22
3919	875	740	21M	·6215	18·84448	10·932	**818**	6	Ap	9	·47	1	My	9	·00	2	Je	7	·53	4	Jl	7●○	·06	5	Au	5	·59
3920	876	741	21M	·8802	7·95291	7·089	**819**	3	Mr	29	·83	5	Ap	28	·37	6	My	27	·90	1	Je	26●	·43	2 4	Jl Au	25 24	·96 ·49
3921	877	742	21M	·1389	26·59193	5·223	**820**	2	Ap	16	·73	4	My	16○	·26	5	Je	14	·79	7	Jl	14	·32	1	Au	12	·85
3922	878	743	21M	·3976	15·70037	1·381	**821**	7	Ap	6	·10	1	My	5●○	·68	3	Je	4	·16	4	Jl	3	·69	6	Au	2	·22
3923	879	744	21M	·6562	4·81881	25·103	**822**	4	Mr	26	·47	6	Ap	25●	·00	7 2	My Je	24 23	·53 ·06	3	Jl	22	·59	5	Au	21	·12
3924*	880	745	21M	9149	23·44782	23·227	**823**	3	Ap	14	·36	4	My	13	·89	6	Je	12	·43	7	Jl	11	·96	2	Au	10	·49
3925	881	746	21M	1736	12·55626	19·385	**824**	7	Ap	2	·73	2	My	2	·26	3	My	31	·79	5	Je	30	·32	6	Jl	29	·85
3926	882	747	21M	·4323	1·66470	15·543	**825**	5	Mr	23	·10	6 1	Ap My	21 21	·63 ·16	2	Je	19	·69	4	Jl	19	·22	5	Au	17○	·75
3927	883	748	21M	·6910	20·30372	13·676	**826**	4	Ap	11	00	5	My	10	·53	7	Je	9	·06	1	Jl	8	·59	3	Au	7●	·12
3928	884	749	21M	·9496	9·41246	9·834	**827**	1	Mr	31	·36	2	Ap	29	·89	4	My	29	·42	5	Je	27○	·95	7	Jl	27	·49
3929	885	750	21M	·2083	28·05119	7·968	**828**	7	Ap	18	26	1	My	17	·79	3	Je	16○	·32	4	Jl	15	·85	6	Au	14	·38
3930	886	751	21M	·4670	17·15961	4·126	**829**	4	Ap	7	·63	6	My	7	·16	7	Je	5●○	·69	2	Jl	5	·22	3	Au	3	·75
3931	887	752	21M	·7257	6·26805	0·283	**830**	1	Mr	27	·99	3	Ap	26	·53	5	My	26	06	6 1	Je Jl	24 24	·59 ·12	2	Au	22	·65
3932	888	753	21M	·9844	24·90708	25·971	**831**	7	Ap	15○	·89	2	My	15●	·42	3	Je	13	·95	5	Jl	13	·48	7	Au	12	·01
3933	889	754	21M	·2431	14·01551	22·129	**832**	5	Ap	4○	·26	6	My	3	·79	1	Je	2	·32	2	Jl	1	·85	4	Jl	31	·38
3934	890	755	21M	5017	3·12395	18·287	**833**	2	Mr	24●○	63	4	Ap	23	·16	5 7	My Je	22 21	·69 ·22	1	Jl	20	·75	3	Au	19	·28
3935	891	756	21M	·7604	21·76298	16·421	**834**	1	Ap	12	·52	3	My	12	05	4	Je	10	·59	6	Jl	10	·12	7	Au	8	·65
3936	892	757	22M	·0191	10·87140	12·579	**835**	5	Ap	1	·89	7	My	1	·42	2	My	30	·95	3	Je	29	·48	5	Jl	29○	·01
3937	893	758	21M	·2778	29·51043	8·736	**836**	4	Ap	19	·79	6	My	19	·32	7	Je	17	85	2	Jl	17●○	·38	3	Au	15	·91
3938	894	759	21M	·5365	18·61887	6·870	**837**	2	Ap	9	·16	3	My	8	·69	5	Je	7	22	6	Jl	6	·75	1	Au	5	·28
3939	895	760	21M	·7951	7·72760	3·028	**838**	6	Mr	29	·52	1	Ap	28	·05	2	My	27○	·58	4 5	Je Jl	26 25	·11 ·65	7	Au	24	·18
3940	896	761	22M	0538	26·36682	1·161	**839**	5	Ap	17	·42	6	My	16○	·95	1	Je	15	·48	3	Jl	15	·01	4	Au	13	·54
3941	897	762	21M	.3125	15·47476	24·874	**840**	2	Ap	5	·79	4	My	5●○	·32	5	Je	3	·85	7	Jl	3	·38	1	Au	1	·91
3942	898	763	21M	·5712	4·58319	21·032	**841**	7	Mr	26	·15	1	Ap	24●	·69	3 4	My Je	24 22	·22 75	6	Jl	22	·28	7	Au	20	·81
3943	899	764	21M	·8299	23·22222	19·176	**842**	6	Ap	14	·05	7	My	13	·58	2	Je	12	·11	3	Jl	11	·64	5	Au	10	·17
3944	900	765	22M	·0885	12·33066	15·323	**843**	3	Ap	3	·42	4	My	2	·95	6	Je	1	·48	1	Jl	1	·01	2	Jl	30	·54
3945	901	766	21M	·3472	1·43909	11·481	**844**	7	Mr	22	·79	2 3	Ap My	21 20	·32 ·85	5	Je	19	·38	6	Jl	18	·91	1	Au	17	·44
3946	902	767	21M	·6059	20·07811	9·615	**845**	6	Ap	10	·68	1	My	10	·21	2	Je	8	·75	4	Jl	8○	·28	5	Au	6●	·81
3947	903	768	21M	·8646	9·18655	5·773	**846**	4	Mr	31	·05	6	Ap	29	·58	7	My	29	,11	1	Je	27○	·64	3	Jl	27	·17
3948	904	769	22M	·1233	27·82557	3·906	**847**	2	Ap	18	·95	4	My	18	·48	6	Je	17○	·01	7	Jl	16	·54	2	Au	15	·07
3949	905	770	21M	·3819	16·93401	0·064	**848**	7	Ap	7	·32	1	My	6	·85	3	Je	5●	·38	4	Jl	4	·91	6	Au	3	·44

*** For Sūrya siddhānta figures for A.D. 500 to**

Ending moments of tithis are the same for Ārya and Sūrya siddhāntas.

from A.D. 500 to A.D. 999 (Ārya siddhānta)*—*cont.*

Āśvina.				Kārttika.				Mārgaśīrsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
6	S	18○	·48	7	O	17	·96	2	N	16	·50	4	D	16	·02	**96**	5	Jr	14	·55		7	F	13	08	1	Mr	13○	·61
3	S	6●○	·80	5	O	6	·33	6	N	4	·86	1	D	4	·39	**97**	2	Jr	2	·92		4	F	1	45	5	Mr	2	·98
1	Au	27	·17	2	S	25	·70	4	O	25	·23	5	N	23	·76		7	D	23	·29	**98**	1	Jr	21○	·82	3	F	20	·35
7	S	15	·06	1	O	14	·59	3	N	13	·12	4	D	12	·65	**99**	6	Jr	11○	·19		7	F	9	·72	2	Mr	11	·25
4	S	4	·43	5	O	3	·96	7	N	2	·49	2	D	2	·02		3	D	31○	·55	**800**	5	Jr	30	·08	6	F	28	·61
3	S	22	·82	4	O	21	·86	6	N	20	·39	7	D	19	·92	**01**	2	Jr	18	·45		3	F	16	·98	5	Mr	18	·51
7	S	11	·70	2	O	11	·23	3	N	9	·76	5	D	9	·29	**02**	6	Jr	7	·82		1	F	6	·35	2	Mr	7	·88
5	S	1	·06	6	S	30	·59	1	O	30○	·18	2	N	28●	·66		4	D	28	·19	**03**	5	Jr	26	·72	7	F	25	·25
3	S	19	·96	5	O	19○	·49	7	N	18	·02	1	D	17	·55	**04**	3	Jr	16	·09		4	F	14	·61	6	Mr	15	·15
1	S	8	·33	2	O	7	·86	4	N	6	·39	5	D	5	·92	**05**	7	Jr	4	·45		1	F	2	·98	3	Mr	4	·51
5	Au	28○	·70	7	S	27	·23	1	O	26	·76	3	N	25	29		4	D	24	·82	**06**	6	Jr	23	·35	1	F	21○	·96
4	S	16●	·59	6	O	16	·12	7	N	14	·65	2	D	14	·19	**07**	3	Jr	12	·72		5	F	11●○	·25	6	Mr	12	·78
1	S	5	·96	3	O	5	·49	5	N	4	·02	6	D	3	·55	**08**	1	Jr	2	·08		2	Jr	31●	·61	4	Mr	1	·14
{6	Au	25	·32	2	O	23	·39	3	N	21	·92	5	D	21○	·45	**09**	6	Jr	19	·98		1	F	18	·51	3	Mr	20	·04
7	S	23	·86																										
5	S	13	·23	6	O	12	·76	1	N	11	·29	2	D	10○	·82	**10**	4	Jr	9	·35		5	F	7	·88	7	Mr	9	·41
2	S	2	·59	4	O	2	·12	5	O	31	·65	7	N	30●○	·18		1	D	29	·71	**11**	3	Jr	28	·25	4	F	26	·78
1	S	21	·49	3	O	21	·02	4	N	19	·55	6	D	19	·08	**12**	7	Jr	17	·61		2	F	16	·14	3	Mr	16	·67
5	S	9	·86	7	O	9○	·39	1	N	7●	·92	3	D	7	·45	**13**	4	Jr	5	·98		6	F	4	·51	1	Mr	6	·04
3	Au	30	·22	4	S	28○	·75	6	O	28	·29	7	N	26	·82		2	D	26	·35	**14**	3	Jr	24	·88	5	F	23	·41
2	S	18○	·12	3	O	17	·65	5	N	16	18	6	D	15	·71	**15**	1	Jr	14	·24		2	F	12	·77	4	Mr	14	·31
6	S	7●	·49	1	O	7	·02	2	N	5	·55	4	D	5	·08	**16**	5	Jr	3	·61		7	F	2○	·14	1	Mr	2●	·67
3	Au	26	·86	5	S	25	·39	6	O	24	·92	1	N	23	·45		2	D	22	·98	**17**	4	Jr	21○	·51	6	F	20●	·04
2	S	14	·75	4	O	14	·28	5	N	12	·81	7	D	12	·35	**18**	1	Jr	10○	·88		3	F	9	·41	4	Mr	10	·94
7	S	4	·12	1	O	3	·65	3	N	2	·18	4	D	1	·71		6	D	31	·24	**19**	7	Jr	29	·77	2	F	28	·30
6	S	23	·02	7	O	22	·55	2	N	21	·08	3	D	20	·61	**20**	5	Jr	19	·14		6	F	17	·67	1	Mr	18	·20
3	S	11	·39	4	O	10	·92	6	N	9○	·45	7	D	8●	·98	**21**	2	Jr	7	·51		4	F	6	·04	5	Mr	7	·57
7	Au	31	·75	2	S	30	·28	3	O	29○	·81	5	N	28	·34		6	D	27	·87	**22**	1	Jr	26	·41	2	F	24	·94
6	S	19	·65	1	O	19○	·18	2	N	17	·71	4	D	17	·24	**23**	5	Jr	15	·27		7	F	14	·30	1	Mr	15	·83
4	S	9○	·02	5	O	8●	·55	7	N	7	·08	1	D	6	·61	**24**	3	Jr	5	·14		4	F	3	·67	6	Mr	4○	·20
1	Au	28○	·38	2	S	26●	·91	4	O	26	·45	5	N	24	·98		7	D	24	·51	**25**	2	Jr	23	·04	3	F	21○	·57
7	S	16	·28	1	O	15	·81	3	N	14	·34	4	D	13	·87	**26**	6	Jr	12	·40		7	F	10	·93	2	Mr	12	·47
4	S	5	65	6	O	5	·18	7	N	3	·71	2	D	3	·24	**27**	3	Jr	1○	·77		5	Jr	31	·30	6	Mr	1	83
{2	Au	26	·02	5	O	24	·08	6	N	22	·61	1	D	22○	·14	**28**	2	Jr	20	·67		4	F	19	·20	5	Mr	19	·73
3	S	24	·55																										
1	S	12	·91	2	O	12	·44	4	N	10	·97	5	D	10○	·51	**29**	7	Jr	9	·04		1	F	7	·57	3	Mr	9	·10
5	S	2	·28	6	O	1	·81	1	O	31	·34	2	N	29●	·87		4	D	29	·40	**30**	5	Jr	27	·93	7	F	26	·46
4	S	21	·81	5	O	20○	·71	7	N	19	·24	1	D	18	·77	**31**	3	Jr	17	·30		5	F	15	·83	6	Mr	17	·36
1	S	10	·55	3	O	10○	·08	4	N	8	·61	6	D	8	·14	**32**	7	Jr	6	·67		2	F	5	·20	3	Mr	5	·73
5	Au	29	·91	7	S	28○	·44	1	O	27	·97	3	N	26	·50		5	D	26	·08	**33**	6	Jr	24	·57	1	F	23	·10
4	S	17●	·81	6	O	17	·34	7	N	15	·87	2	D	15	·40	**34**	3	Jr	13	·93		5	F	12○	·46	6	Mr	13●	·99
2	S	7●	·18	3	O	6	·71	5	N	5	·24	6	D	4	·77	**35**	1	Jr	3	·30		2	F	1○	·83	4	Mr	3●	36
6	Au	27	·54	1	S	26	·07	2	O	25	·61	4	N	24	·14		5	D	23	·67	**36**	7	Jr	22○	·20	{1	F	20	·73
																										3	Mr	21	·26
5	S	14	·44	6	O	13	·97	1	N	12	·50	3	D	12	·03	**37**	4	Jr	10	·56		6	F	9	·09	7	Mr	10	·63
2	S	3	·83	4	O	3	·34	5	N	1	·87	7	D	1	·40		1	D	30●	·98	**38**	3	Jr	29	·46	4	F	27	·99
1	S	22	·71	3	O	22	·24	4	N	20○	·77	6	D	20	30	**39**	7	Jr	18	·88		2	F	17	·36	3	Mr	18	·89
6	S	12	·07	7	O	11	·60	2	N	10○	13	3	D	9	·67	**40**	5	Jr	8	·20		6	F	6	·73	1	Mr	7	·26
3	Au	31	·44	4	S	29	·97	6	O	29●○	50	1	N	28	·03		2	D	27	·56	**41**	4	Jr	26	·09	5	F	24	·62
2	S	19	34	3	O	18●	·87	5	N	17	·40	6	D	16	·98	**42**	1	Jr	15	·46		2	F	13	·99	4	Mr	15○	·52
6	S	8○	·71	1	O	8	·24	2	N	6	77	4	D	6	·30	**43**	5	Jr	4	·83		7	F	3	·36	1	Mr	4●○	·89
4	Au	29●○	·07	5	S	27	·60	7	O	27	·13	1	N	25	·66		3	D	25	·19	**44**	4	Jr	23	·73	6	F	22●	·26
2	S	15	·97	4	O	15	·50	6	N	14	·03	7	D	13	·56	**45**	2	Jr	12○	·09		3	F	10●	62	5	Mr	12	·15
7	S	5	·34	1	O	4	·87	3	N	3	·40	4	D	2	·93	**46**	6	Jr	1○	·46		7	Jr	30	·99	2	Mr	1	·52
{4	Au	25	·70	7	O	28	77	2	N	22	·80	3	D	21●○	·83	**47**	5	Jr	20	·36		6	F	18	·89	1	Mr	20	·42
6	S	24	·23																										
3	S	13	·60	5	O	13	·13	6	N	11	·66	1	D	11	·19	**48**	2	Jr	9	·72		4	F	8	·25	5	Mr	8	·79
7	S	1	·97	2	O	1	·50	4	O	31○	·03	5	N	29	·56		7	D	29	·09	**49**	1	Jr	27	·62	3	F	26	·15

A.D. 999 see pages 238 to 241 below.

***For tithis by Brahma siddhānta add algebraically — ·04 to the above.**

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era. A.D.	Vaiśākha. Week-day.	Vaiśākha. Month.	Vaiśākha. Day.	Vaiśākha. Fraction.	Jyeshṭha. Week-day.	Jyeshṭha. Month.	Jyeshṭha. Day.	Jyeshṭha. Fraction.	Āshāḍha. Week-day.	Āshāḍha. Month.	Āshāḍha. Day.	Āshāḍha. Fraction.	Śrāvaṇa. Week-day.	Śrāvaṇa. Month.	Śrāvaṇa. Day.	Śrāvaṇa. Fraction.	Bhādrapada. Week-day.	Bhādrapada. Month.	Bhādrapada. Day.	Bhādrapada. Fraction.
3950	906	771	21M	·6406	6·04245	23·776	**849**	4	Mr	27	·68	6	Ap	26○	·21	7	My	25	·74	2 3	Je Jl	24 23	·27 ·81	5	Au	22	·34
3951	907	772	21M	·8993	24·68146	21·910	**850**	3	Ap	15○	·58	5	My	15	·11	6	Je	13	·64	1	Jl	13	·17	2	Au	11	·70
3952	908	773	22M	·1580	13·78990	18·068	**851**	7	Ap	4●○	·95	2	My	4	·48	4	Je	3	·01	5	Jl	2	·54	7	Au	1	·07
3953	909	774	21M	4167	2·89834	14·226	**852**	5	Mr	24	81	6	Ap	22	·85	1 2	My Je	22 20	38 ·91	4	Jl	20	44	5	Au	18	97
3954	910	775	21M	·6753	21·53736	12·359	**853**	4	Ap	12	·21	5	My	11	74	7	Je	10	·27	1	Jl	9	·80	3	Au	8○	·33
3955	911	776	21M	·9340	10·64580	8·517	**854**	1	Ap	1	·58	3	My	1	·11	4	My	30	·64	6	Je	29	·17	7	Jl	28○	·70
3956	912	777	22M	·1927	29·28482	6·651	**855**	7	Ap	20	·48	2	My	20	·01	3	Je	18	·54	5	Jl	18	·07	6	Au	16	·60
3957	913	778	21M	4514	18·39326	2·809	**856**	4	Ap	8	·84	6	My	8	·37	7	Je	6○	.91	2	Jl	6●	·44	3	Au	4	·97
3958	914	779	21M	7101	7·50169	26·521	**857**	2	Mr	29	·21	3	Ap	27	74	5	My	27○	·27	6 1	Je Jl	25 25	·80 ·88	2	Au	23	·86
3959	915	780	21M	9687	26·14065	24·655	**858**	1	Ap	17	11	2	My	16○	64	4	Je	15	·17	5	Jl	14	·70	7	Au	13	23
3960	916	781	22M	2274	15·24976	20·813	**859**	5	Ap	6	48	7	My	6●	·01	1	Je	4	54	3	Jl	4	·07	4	Au	2	·60
3961	917	782	21M	·4861	4·35759	16·970	**860**	2	Mr	25○	·84	4	Ap	24	37	5 7	My Je	23 22	·90 ·43	1	Jl	21	·97	3	Au	20	·50
3962	918	783	21M	·7448	22·99662	15·104	**861**	1	Ap	13	·74	3	My	13	·27	4	Je	11	·80	6	Jl	11	·33	7	Au	9	·86
3963	919	784	22M	0035	12·10505	11·262	**862**	6	Ap	3	·11	7	My	2	·64	2	Je	1	·17	3	Je	30	·70	5	Jl	30	·23
3964	920	785	22M	·2621	1·21348	7·419	**863**	3 5	Mr Ap	23 22	·47 ·01	6	My	21	·54	1	Je	20	·85	2	Jl	19○	·60	4	Au	18●	·13
3965	921	786	21M	·5208	19·85251	5·558	**864**	2	Ap	10	·37	3	My	9	·90	5	Je	8	·43	6	Jl	7○	·96	1	Au	6●	·49
3966	922	787	21M	·7795	8·96095	1·711	**865**	6	Mr	30	·74	1	Ap	29	·27	2	My	28	80	4	Je	27○	·33	5 7	Jl Au	26 25	·86 ·39
3967	923	788	22M	·0382	27·59996	27·399	**866**	5	Ap	18	·64	7	My	18	·17	1	Je	16●	·70	3	Jl	16	·28	4	Au	14	·76
3968	924	789	22M	·2969	16·70841	23·557	**867**	3	Ap	8	·00	4	My	7○	·58	6	Je	6●	·07	7	Jl	5	·60	2	Au	4	·18
3969	925	790	21M	·5556	5·81684	19·715	**868**	7	Mr	27	·37	1	Ap	25○	·90	3	My	25	·48	4 6	Je Jl	23 23	·96 ·49	1	Au	22	·02
3970	926	791	21M	·8142	24·45586	17·848	**869**	6	Ap	15○	·27	7	My	14	·80	2	Je	13	·33	3	Jl	12	·86	5	Au	11	·39
3971	927	792	22M	·0729	13·56430	14·006	**870**	3	Ap	4	·64	5	My	4	·17	6	Je	2	·70	1	Jl	2	·23	2	Jl	31	·76
3972	928	793	22M	·3316	2·67283	10·164	**871**	1	Mr	25	·00	2 4	Ap My	23 23	·53 ·06	5	Je	21	·59	7	Jl	21	·12	1	Au	19○	·66
3973	929	794	21M	·5903	21·31175	8·298	**872**	6	Ap	11	·90	1	My	11	·48	2	Je	9	·96	4	Jl	9	·49	6	Au	8○	·09
3974	930	795	21M	·8490	10·42019	4·455	**873**	4	Ap	1	27	5	Ap	30	·80	7	My	30	·33	1	Je	28	·86	3	Jl	28●	·32
3975	931	796	22M	1076	29·05922	2·589	**874**	3	Ap	20	·16	4	My	19	·70	6	Je	18○	·23	7	Jl	17●	·76	2	Au	16	·29
3976	932	797	22M	·3663	18·16765	26·301	**875**	7	Ap	9	·53	2	My	9	·06	3	Je	7○	·59	5	Jl	7	·12	6	Au	5	·65
3977	933	798	21M	·6250	7·27608	22·459	**876**	4	Mr	28	90	6	Ap	27	·43	7	My	26●○	·96	2 4	Je Jl	25 25	·49 ·02	5	Au	23	·55
3978	934	799	21M	·8837	25·91511	20·593	**877**	3	Ap	16	·80	5	My	16	·32	6	Je	14	·86	1	Jl	14	·39	2	Au	12	·92
3979	935	800	22M	·1424	15·02354	16·751	**878**	1	Ap	6○	·16	2	My	5●	·69	4	Je	4	·22	5	Jl	3	·76	7	Au	2	·29
3980	936	801	22M	·4009	4·13198	12·908	**879**	5	Mr	26○	·53	7	Ap	25	·06	1 3	My Je	24 23	·59 ·12	4	Jl	22	·65	6	Au	21	·18
3981	937	802	21M	·6597	22·77101	11·042	**880**	4	Ap	13	.48	5	My	12	·96	7	Je	11	·49	2	Jl	11	·02	3	Au	9	·55
3982	938	803	21M	·9184	11·87944	7·200	**881**	1	Ap	2	·80	3	My	2	·33	4	My	31	·86	6	Je	30	·89	7	Jl	29○	·92
3983	939	804	22M	·1771	0·98787	3·358	**382**	6 7	Mr Ap	23 21	·16 ·69	2	My	21	·22	3	Je	19	·75	5	Jl	19○	·28	6	Au	17	·82
3984	940	805	22M	·4358	19·62690	1·491	**883**	5	Ap	11	·06	6	My	10	·59	1	Je	9	·12	2	Jl	8●○	·65	4	Au	7	·18
3985	941	806	21M	·6944	8·73533	25·204	**884**	2	Mr	30	·48	3	Ap	28	·96	5	My	28	·49	7	Je	27	·05	1 3	Jl Au	26 25	·55 ·08
3986	942	807	21M	·9531	27·37436	23·337	**885**	1	Ap	18	·32	2	My	17○	·86	4	Je	16●	·39	5	Jl	15	·92	7	Au	14	·45
3987	943	808	22M	·2118	16·48280	19·495	**886**	5	Ap	7	·69	7	My	7○	·22	1	Je	5	·75	3	Jl	5	·28	4	Au	3	·81
3988	944	809	22M	·4705	5·59122	15·653	**887**	3	Mr	28	·06	4	Ap	26○	·59	6	My	26	·12	7 2	Je Jl	24 24	·65 ·18	3	Au	22	·71
3989	945	810	21M	·7292	24·23025	13·787	**888**	1	Ap	14●	·96	3	My	14	·49	5	Je	13	·02	6	Jl	12	·55	1	Au	11	·08
3990	946	811	21M	·9878	13·33869	9·944	**889**	6	Ap	4●	·32	7	My	3	·85	2	Je	2	·38	3	Jl	1	·92	5	Jl	31	·45
3991	947	812	22M	·2465	2·44712	6·102	**890**	3	Mr	24	·69	5 6	Ap My	23 22	·22 ·75	1	Je	21	·28	2	Jl	20	·81	4	Au	19●○	·34
3992	948	813	22M	·5052	21·08615	4·236	**891**	2	Ap	12	·59	4	My	12	·12	5	Je	10	·65	7	Jl	10	·18	1	Au	8●○	71
3993	949	814	21M	·7639	10·19459	0·394	**892**	6	Mr	31	·96	1	Ap	30	·49	3	My	30	·02	4	Je	28○	·55	6	Jl	28	·08
3994	950	815	22M	·0226	28·83360	26·082	**893**	5	Ap	19	·85	7	My	19	·38	1	Je	17○	·91	3	Jl	17	·44	4	Au	15	·98
3995	951	816	22M	·2812	17·94204	22·240	**894**	3	Ap	9	·22	4	My	8	·75	6	Je	7●○	·28	7	Jl	6	·81	2	Au	5	·34
3996	952	817	22M	·5399	7·04979	18·397	**895**	7	Mr	29	·59	2	Ap	28	·12	3	My	27●	·65	5 6	Je Jl	26 25	·18 .71	1	Au	24	·24
3997	953	818	21M	·7986	25·68950	16·531	**896**	6	Ap	16○	·48	1	My	16	·02	2	Je	14	·55	4	Jl	14	·08	5	Au	12	·61
3998	954	819	22M	·0573	14·79794	12·689	**897**	3	Ap	5●○	·85	5	My	5	·38	6	Je	3	·91	1	Jl	3	·44	2	Au	1	·97
3999	955	820	22M	·3160	3·90637	8·846	**898**	1	Mr	26●○	·22	2	Ap	24	·75	4 5	My Je	24 22	·28 ·81	7	Jl	22	·34	1	Au	20	·87
4000	956	821	22M	·5746	22·54539	6.980	**889**	7	Ap	14	·12	1	My	13	·65	3	Je	12	·18	4	Jl	11	·71	6	Au	10○	·24
4001	957	822	21M	·8333	11·65384	3·138	**900**	4	Ap	2	·49	6	My	2	·02	7	My	31	·55	2	Je	30	·08	3	Jl	29○	·61
4002	958	823	22M	·0920	0·76328	26·850	**901**	1 3	Mr Ap	22 21	·86 ·39	4	My	20	·92	6	Je	19	·45	7	Jl	18○	·98	2	Au	17	·51
4003	959	824	22M	·3507	19·40129	24·984	**902**	7	Ap	10	·75	2	My	10	·28	3	Je	8	·82	5	Jl	8●	·35	6	Au	6	·88

* For Sūrya siddhānta figures for A.D 500 to

Ending moments of tithis are the same for Ārya and Sūrya siddhāntas.

from A.D. 500 to A.D. 999 (Ārya siddhānta)*—cont.

Aśvina Week-day	Month	Day	Fraction	Kārttika Week-day	Month	Day	Fraction	Mārgaśīrsha Week-day	Month	Day	Fraction	Pausha Week-day	Month	Day	Fraction	A.D.	Māgha Week-day	Month	Day	Fraction	A.D.	Phālguna Week-day	Month	Day	Fraction	Chaitra Week-day	Month	Day	Fraction
6	S	20	·87	1	O	20○	·40	2	N	18	93	4	D	18	·46	**50**	5	Jr	16	·99		7	F	15	·52	2	Mr	17	·05
4	S	10	·23	5	O	9●○	76	7	N	8	·29	1	D	7	·83	**51**	3	Jr	6	·86		4	F	4	·89	6	Mr	6	·42
1	Au	30	·60	3	S	29	·18	4	O	28	·66	6	N	27	·19		7	D	26	·72	**52**	2	Jr	25	·25	3	F	23○	·78
7	S	17	·50	2	O	17	·08	3	N	15	·56	5	D	15	·09	**53**	6	Jr	13	·62		1	F	12○	·15	2	Mr	13	·68
4	S	6●	·87	6	O	6	·40	7	N	4	·93	2	D	4	·46	**54**	3	Jr	2	·99		5	F	1●○	52	7	Mr	3	·05
2	Au	27	·23	3	S	25	·76	5	O	25	·29	6	N	23	·82		1	D	23	·35	**55**	2	Jr	21	·89	4	F	20	·42
																										5	Mr	21	·95
1	S	15	13	2	O	14	·66	4	N	13	·19	5	D	12	·72	**56**	7	Jr	11	·25		1	F	9	78	3	Mr	10	·81
5	S	3	·50	7	O	3	·08	1	N	1	·56	3	D	1○	·09		4	D	30●	·62	**57**	6	Jr	29	·18	7	F	27	·68
4	S	22	89	5	O	21	·93	7	N	20○	·46	1	D	19	·99	**58**	3	Jr	18	·52		5	F	17	·05	6	Mr	18	·58
1	S	11	76	3	O	11	·29	4	N	9○	·82	6	D	9	·35	**59**	7	Jr	7	·88		2	F	6	41	3	Mr	7	·95
6	S	1	·13	7	S	30	66	2	O	30	·19	3	N	28	·72		5	D	28	·25	**60**	6	Jr	26	·78	1	F	25	·31
5	S	19○	·03	6	O	18●	·56	1	N	17	09	2	D	16	·62	**61**	4	Jr	15	·15		5	F	13	·68	7	Mr	15●○	·21
2	S	8○	·39	3	O	7	·92	5	N	6	·45	6	D	5	·99	**62**	1	Jr	4	·52		3	F	3	·05	4	Mr	4●	·58
6	Au	28●	·76	1	S	27	·29	2	O	26	·82	4	N	25	·35		5	D	24	·88	**63**	7	Jr	23○	·41	1	F	21	·94
5	S	16	·66	7	O	16	·19	1	N	14	·72	3	D	14	·25	**64**	4	Jr	12○	·78		6	F	11	·31	7	Mr	11	·84
3	S	5	·03	4	O	4	56	6	N	3	·09	7	D	2	·62	**65**	2	Jr	1○	·15		3	Jr	30	·68	5	Mr	1	·21
1	S	23	·92	3	O	23	·45	4	N	21	98	6	D	21	·51	**66**	1	Jr	20	·05		2	F	18	·58	4	Mr	20	·11
6	S	13	·29	7	O	12	82	2	N	11○	·85	3	D	10●	·88	**67**	5	Jr	9	·41		6	F	7	·94	1	Mr	9	·47
3	S	2	·66	5	O	2	·19	6	O	31○	·72	1	N	30	·25		2	D	29	·78	**68**	4	Jr	28	·31	5	F	26	·84
2	S	29	·55	4	O	20○	·09	5	N	18	·62	7	D	18	·15	**69**	1	Jr	16	·68		3	F	15	·21	4	Mr	16	·74
6	S	9	·92	1	O	9●	·45	2	N	7	·98	4	D	7	·51	**70**	6	Jr	6	·04		7	F	4	·57	2	Mr	6○	·11
4	Au	30	·29	5	S	28	·82	7	O	28	·35	1	N	26	·88		3	D	26	·41	**71**	4	Jr	24	94	6	F	23○	·47
3	S	18	·19	4	O	17	·72	6	N	16	·25	7	D	15	·78	**72**	2	Jr	14	·31		3	F	12○	·84	5	Mr	13	·37
7	S	6	·55	2	O	6	·08	3	N	4	·61	5	D	4	·14	**73**	6	Jr	2	·68		1	F	1●	·21	2	Mr	2	·74
4	Au	26	·92	6	S	25	·45	7	O	24	·98	2	N	23	·51		4	D	28	·04	**74**	5	Jr	21	·57	7	F	20	·10
																										1	Mr	21	·68
3	S	14	·82	5	O	14	·35	6	N	12	·89	1	D	12○	·41	**75**	2	Jr	10	·94		4	F	9	·47	6	Mr	11	·00
1	S	4	·19	2	O	3	·72	4	N	2	·25	5	D	1○	·78		7	D	31	·31	**76**	1	Jr	29	·84	3	F	28	·37
7	S	22	·08	1	O	21	·61	3	N	20○	·14	4	D	19	·67	**77**	6	Jr	18	·20		7	F	16	·74	2	Mr	18	·27
4	S	11	·45	5	O	10	·98	7	N	9●	·51	2	D	9	·04	**78**	3	Jr	7	·57		5	F	6	·10	6	Mr	7	·63
1	Au	31	·82	3	S	30○	·35	4	O	29	·88	6	N	28	·41		7	D	27	·94	**79**	2	Jr	26	47	4	F	25	·00
7	S	19○	·71	2	O	19	·24	3	N	17	·78	5	D	17	·81	**80**	6	Jr	15	·84		1	F	14	·87	2	Mr	14○	·90
5	S	8●○	·08	6	O	7	·61	1	N	6	·14	2	D	5	·67	**81**	4	Jr	4	·20		5	F	2○	·73	7	Mr	4	·26
2	Au	28	45	3	S	26	·98	5	O	26	·51	7	N	25	·04		1	D	24	·57	**82**	3	Jr	28○	·10	4	F	21	·68
1	S	16	·35	2	O	15	·88	4	N	14	·41	5	D	13	·94	**83**	7	Jr	12○	·47		2	F	11	00	3	Mr	12	·53
5	S	5	·71	7	O	5	·24	1	N	3	·77	3	D	3	·30	**84**	4	Jr	1●	·84		6	Jr	31	·37	7	F	29	·90
4	S	23	·61	6	O	23	·14	7	N	21○	·67	2	D	21●	·20	**85**	3	Jr	19	·73		5	F	18	·26	6	Mr	19	·79
1	S	12	·98	3	O	12	·51	5	N	11○	·04	6	D	10	·57	**86**	1	Jr	9	·10		2	F	7	·63	4	Mr	9	·16
6	S	2	·34	7	O	1	·88	2	O	31○	·41	3	N	29	·94		5	D	29	·47	**87**	7	Jr	28	·00	1	F	26	·53
5	S	21	·24	6	O	20	·77	1	N	19	·30	3	D	18	·83	**88**	4	Jr	17	·86		5	F	15	·90	7	Mr	16○	·43
2	S	9	·61	4	O	9●	·14	5	N	7	·67	7	D	7	·20	**89**	1	Jr	5	·73		3	F	4	·26	4	Mr	5○	·79
6	Au	29○	·98	1	S	28	·51	3	O	28	·04	4	N	26	·57		6	D	26	·10	**90**	7	Jr	24	·63	2	F	23○	·16
5	S	17	·87	7	O	17	·40	1	N	15	·94	3	D	15	·47	**91**	5	Jr	14	·00		6	F	12	·53	1	Mr	14	·06
3	S	7	·24	4	O	6	·77	6	N	5	·30	7	D	4	·83	**92**	2	Jr	3	·36		3	F	1●	·89	5	Mr	2	·42
7	Au	26	·61	2	S	25	·14	**Mārgaśīrsha Kshaya.**				5	N	23	·20		6	D	22○	·78	**93**	1	Jr	21	·26	2	F	19	·79
				3	O	24	·67																			4	Mr	21	·32
6	S	14	·51	1	O	14	·04	2	N	12	·57	4	D	12○	·10	**94**	5	Jr	10	·63		7	F	9	·16	1	Mr	10	·69
3	S	3	·87	5	O	3	·40	6	N	1	·98	1	D	1●○	·46		3	D	31	·00		4	Jr	29	·58	6	F	28	·06
2	S	22	·77	4	O	22	·30	5	N	20●	·88	7	D	20	·86	**96**	1	Jr	18	·89	**95**	3	F	17	·42	4	Mr	17	·95
7	S	11	·14	1	O	10○	·67	3	N	9	·20	4	D	8	·73	**97**	6	Jr	7	·26		7	F	5	·79	2	Mr	7	·32
4	Au	31	·50	6	S	30○	·04	7	O	29	·57	2	N	28	·10		3	D	27	·63	**98**	5	Jr	26	·16	6	F	24	·69
3	S	19○	·40	4	O	18	·93	6	N	17	·46	7	D	16	·99	**99**	2	Jr	15	·52		4	F	14	·08	5	Mr	15●	·59
7	S	8	·77	2	O	8	·30	3	N	6	·83	5	D	6	·36	**900**	6	Jr	4	·89		1	F	8○	·42	2	Mr	8	·95
5	Au	28	·14	6	S	26	·67	1	O	26	·20	2	N	24	·73		4	D	24	·26	**01**	5	Jr	22●○	80	7	F	21	·38
4	S	16	·04	5	O	15	·57	7	N	14	·10	1	D	13	·63	**02**	3	Jr	12	·16		4	F	10	·69	6	Mr	12	·22
1	S	5	·41	2	O	4	·94	4	N	3	·47	6	D	3○	·00	**03**	7	Jr	1	·53		2	Jr	31	·06	3	Mr	1	·59

A.D. 999 see pages 238 to 241 below.
*For tithis by Brahma siddhānta add algebraically — ·04 to the above.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new-moon in solar year.	Anomaly of first new-moon.	Christian era.	Vaiśākha. Week-day.	Month.	Day.	Fraction.	Jyeshṭha. Week day.	Month.	Day.	Fraction.	Āshāḍha. Week-day.	Month.	Day.	Fraction.	Śrāvaṇa. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day.	Month.	Day.	Fraction.
							A.D.																				
4004	960	825	22M	·6094	8·50973	21·142	**903**	5	Mr	31	·12	6	Ap	29	·65	1	My	29○	·18	2	Je	27	·71	4 5	Jl Au	27 25	·24 ·77
4005	961	826	21M	·8680	27·14876	19·275	**904**	4	Ap	18	·02	5	My	17○	·55	7	Je	16	·08	1	Jl	15	·61	3	Au	14	·14
4006	962	827	22M	·1267	16·25719	15·488	**905**	1	Ap	7	·89	2	My	6●○	·92	4	Je	5	·45	5	Jl	4	·98	7	Au	3	·51
4007	963	828	22M	·3854	5·36563	11·591	**906**	5	Mr	27	·75	7	Ap	26●	·28	1	My	25	·81	3 4	Je Jl	24 23	·34 ·88	6	Au	22	·41
4008	964	829	22M	·6441	24·00466	9·725	**907**	4	Ap	15	·65	6	My	15	·18	7	Je	13	·71	2	Jl	13	·24	3	Au	11	·77
4009	965	830	21M	·9028	18·11308	5·883	**908**	2	Ap	4	·02	3	My	3	·55	5	Je	2	·08	6	Jl	1	·61	1	Jl	31	·14
4010	966	831	22M	·1614	2·22152	2·040	**909**	6	Mr	24	·39	7 2	Ap My	22 22	·92 ·45	3	Je	20	·98	5	Jl	20	·51	1	Au	19○	·04
4011	967	882	22M	4201	20·86055	0·174	**910**	5	Ap	12	·28	6	My	11	·81	1	Je	10	·34	2	Jl	9○	·87	4	Au	8	·40
4012	968	833	22M	·6788	9·96898	28·886	**911**	2	Ap	1	·65	4	My	1	·18	5	My	30	·71	7	Je	29○	·24	1	Jl	28	·77
4013	969	834	21M	·9375	28·60801	22·020	**912**	1	Ap	19	·55	3	My	19	·08	4	Je	17○	·61	6	Jl	17	14	7	Au	15	·67
4014	970	835	22M	·1962	17·71644	18·178	**913**	5	Ap	8	·92	7	My	8	·44	1	Je	6●	·98	3	Jl	6	·51	5	Au	5	·04
4015	971	836	22M	·4549	6·82487	14·335	**914**	3	Mr	29	·28	4	Ap	27○	·81	6	My	27	·84	7 2	Je Jl	25 25	·88 ·40	3	Au	23	·94
4016	972	837	22M	·7135	25·46390	12·469	**915**	2	Ap	17○	·18	3	My	16	·71	5	Je	15	·24	6	Jl	14	·77	1	Au	13	·30
4017	973	838	21M	·9722	14·57234	8·627	**916**	6	Ap	5●○	·55	1	My	5	·08	2	Je	3	·61	4	Jl	3	·14	5	Au	1	·67
4018	974	839	22M	·2809	8·68077	4·785	**917**	3	Mr	25	·91	5	Ap	24	·44	6 1	My Je	28 22	·97 ·50	3	Jl	22	·04	4	Au	20	·57
4019	975	840	22M	·4896	22·31980	2·910	**918**	2	Ap	13	·81	4	My	13	·34	5	Je	11	·87	7	Jl	11	·40	1	Au	9○	·93
4020	976	841	22M	·7483	11·42823	26·631	**919**	7	Ap	3	·18	1	My	2	·71	3	Je	1	·24	4	Je	30	·77	6	Jl	30○	·30
4021	977	842	22M	·0069	0·53666	22·789	**920**	4 6	Mr Ap	22 21	·54 ·08	7	My	20	·61	2	Je	19	·14	3	Jl	18●	·67	5	Au	17	·20
4022	978	843	22M	·2656	19·17669	20·922	**921**	3	Ap	10	·44	4	My	9	·97	6	Je	8○	·50	1	Jl	8●	·03	2	Au	6	·56
4023	979	844	22M	·5243	8·28413	17·080	**922**	7	Mr	30	·81	2	Ap	29	·34	3	My	28○	·67	5	Je	27	·40	6 1	Jl Au	26 25	·93 ·46
4024	980	845	22M	·7880	26·92314	15·214	**923**	6	Ap	18	·71	1	My	18○	·24	2	Je	16	·77	4	Jl	16	·30	5	Au	14	·83
4025	981	846	22M	·0417	16·03158	11·372	**924**	4	Ap	7	·07	5	My	6	·60	7	Je	5	·14	1	Jl	4	·67	3	Au	3	·20
4026	982	847	22M	·3008	5·14002	7·529	**925**	1	Mr	27○	·44	2	Ap	25	·97	4 6	My Je	25 24	·50 ·03	7	Jl	23	·56	2	Au	22	·09
4027	983	848	22M	·5590	23·77904	5·663	**926**	7	Ap	15	·34	1	My	14	·87	3	Je	13	·40	4	Jl	12	·93	6	Au	11	·46
4028	984	849	22M	·8177	12·88748	1·821	**927**	4	Ap	4	·71	6	My	4	·24	7	Je	2	·77	2	Jl	2	·30	3	Jl	31	·88
4029	985	850	22M	·0764	1·99592	25·533	**928**	2	Mr	24	·07	3 5	Ap My	22 22	·60 ·13	6	Je	20	·66	1	Jl	20○	·20	2	Au	18●	·73
4030	986	851	22M	·3351	20·63498	23·667	**929**	7	Ap	11	·97	2	My	11	·50	4	Je	10	·08	5	Jl	9○	·56	7	Au	8	·09
4031	987	852	22M	·5937	9·74337	19·822	**930**	5	Ap	1	·34	6	Ap	30	·87	1	My	30	·40	2	Je	28●○	·93	4	Jl	28	·46
4032	988	853	22M	·8524	28·38240	17·959	**931**	4	Ap	20	·24	5	My	19	·77	7	Je	18	·30	1	Jl	17	·83	3	Au	16	·36
4033	989	854	22M	·1111	17·49083	14·116	**932**	1	Ap	8	·60	3	My	8○	·13	4	Je	6	·66	6	Jl	6	·19	7	Au	4	·72
4034	990	855	22M	·3698	6·59927	10·274	**933**	5	Mr	28	·97	7	Ap	27○	·50	2	My	27	·03	3 5	Je Jl	25 25	·56 ·09	6	Au	23	·62
4035	991	856	22M	·6285	25·23830	8·408	**934**	4	Ap	16○	·87	6	My	16	40	7	Je	14	·93	2	Jl	14	·46	3	Au	12	·99
4036	992	857	22M	·8871	14 34672	4 565	**935**	2	Ap	6●	·28	3	My	5	76	5	Je	4	·30	6	Jl	3	·83	1	Au	2	·36
4037	993	858	22M	·1458	3·45516	0·723	**936**	6	Mr	25	·60	1 2	Ap My	24 23	·13 ·66	4	Je	22	·19	5	Jl	21	·72	7	Au	20○	·25
4038	994	859	22M	·4045	22·09419	26·412	**937**	5	Ap	13	·50	7	My	13	·08	1	Je	11	·56	3	Jl	11	·09	4	Au	9○	·62
4039	995	860	22M	6632	11·20292	22·570	**938**	2	Ap	2	·87	4	My	2	·40	5	My	31	·93	7	Je	30	·46	1	Jl	29	·99
4040	996	861	22M	·9219	0·31105	18·727	**939**	7 1	Mr Ap	28 21	·23 ·76	3	My	21	·29	4	Je	19○	·82	6	Jl	19●	36	7	Au	17	·89
4041	997	862	22M	·1805	18 95008	16·861	**940**	6	Ap	10	·13	7	My	9	·66	2	Je	8○	·19	3	Jl	7●	·72	5	Au	6	·25
4042	998	863	22M	4392	8·05851	13·019	**941**	3	Mr	30	·50	5	Ap	29	·03	6	My	28○	·56	1	Je	27	·09	2 4	Jl Au	26 25	·62 ·15
4043	999	864	22M	·6979	26·69754	11·152	**942**	2	Ap	18	·40	3	My	17●	·93	5	Je	16	·46	6	Jl	15	·99	1	Au	14	·52
4044	1000	865	22M	·9566	15 80598	7·310	**943**	6	Ap	7○	·76	1	My	7●	·29	2	Je	5	·82	4	Jl	5	·35	5	Au	3	·88
4045	1001	866	22M	·2153	4 91441	3·468	**944**	4	Mr	27○	·13	5	Ap	25	·67	7 1	My Je	25 23	·19 ·72	3	Jl	23	·25	4	Au	21	·78
4046	1002	867	22M	·4739	23·55343	1·601	**945**	3	Ap	15	·83	4	My	14	·56	6	Je	13	09	7	Jl	12	·62	2	Au	11	·15
4047	1003	868	22M	7326	12·66187	25·314	**946**	7	Ap	4	·39	1	My	3	·92	3	Je	2	·46	4	Jl	1	·99	6	Jl	31	·52
4048	1004	869	22M	·9918	1·77030	21 472	**947**	4	Mr	24	·76	6 7	Ap My	23 22	·29 ·82	2	Je	21	·35	3	Jl	20○	·88	5	Au	19	·41
4049	1005	870	22M	·2500	20·40933	19 605	**948**	3	Ap	11	·66	5	My	11	·19	6	Je	9	·72	1	Jl	9●○	·25	2	Au	7	·78
4050	1006	871	22M	5087	9·51777	15·763	**949**	1	Ap	1	03	2	Ap	30	·56	4	My	30	·09	5	Je	28●	·62	7	Jl	28	·15
4051	1007	872	22M	·7674	28·15678	13 896	**950**	6	Ap	19	·92	1	My	19○	·45	2	Je	17●	·98	4	Jl	17	·52	6	Au	16	05
4052	1008	873	23M	·0260	17·26522	10·055	**951**	4	Ap	9	·29	5	My	8○	·82	7	Je	7	·35	1	Jl	6	·88	3	Au	5	·41
4053	1009	874	22M	·2847	6·37366	6·212	**952**	1	Mr	28	·66	3	Ap	27●○	·19	4	My	26	·72	6 7	Je Jl	25 24	·25 ·78	2	Au	23	·31
4054	1010	875	22M	·5434	25 01368	4 346	**953**	7	Ap	16●	·56	2	My	16	·09	3	Je	14	·62	5	Jl	14	·15	6	Au	12	·68
4055	1011	876	22M	·8021	14·12112	0 504	**954**	4	Ap	5	·92	6	My	5	·45	7	Je	3	·98	2	Jl	3	·51	4	Au	2	·04
4056	1012	877	23M	·0608	3·22955	24·216	**955**	2	Mr	26	·29	3 5	Ap My	24 24	·82 ·35	6	Je	22	·88	1	Jl	22	·41	2	Au	20○	·94
4057	1013	878	22M	·3194	21·86858	22·350	**956**	1	Ap	13	·19	2	My	12	·72	4	Je	11	·25	5	Jl	10	·78	7	Au	9	·31
4058	1014	879	22M	·5781	10·97701	18·508	**957**	5	Ap	2	·55	7	My	2	·08	1	My	31	·62	3	Je	30	·15	4	Jl	29	·68

* For Surya siddhānta figures for A.D. 500 to
Ending moments of tithis are the same for Ārya and Sūrya siddhāntas.

from A.D. 500 to A.D. 999 (Ārya siddhānta)*—cont.

Āśvina.				Kārttika.				Mārgaśīrsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
7	S	24	·80	1	O	23	·84	3	N	22○	·37	4	D	21	·90	**04**	6	Jr	20	·43		7	F	18	·96	2	Mr	19	·49
4	S	12	·67	6	O	12	·20	7	N	10●○	73	2	D	10	·26	**05**	3	Jr	8	·79		5	F	7	·32	6	Mr	8	·86
2	S	2	·04	3	O	1	·57	5	O	31	·10	6	N	29	·63		1	D	29	·16	**06**	2	Jr	27	·69	4	F	26	·22
7	S	20	·94	2	O	20	·47	4	N	19	·00	5	D	18	·58	**07**	7	Jr	17	·06		1	F	15	·59	3	Mr	17○	·12
5	S	10○	80	6	O	9●	·83	1	N	8	·36	2	D	7	·90	**08**	4	Jr	6	·43		5	F	4	·96	7	Mr	5●○	49
2	Au	29○	·67	4	S	28	·20	5	O	27	·73	7	N	26	·26		1	D	25	·79	**09**	3	Jr	24	·82	4	F	22	·85
1	S	17	·57	3	O	17	·10	4	N	15	·63	6	D	15	·16	**10**	7	Jr	13	·69		2	F	12	·22	3	Mr	13	75
5	S	6	·94	7	O	6	·47	2	N	5	·00	3	D	4	·53	**11**	5	Jr	3○	·06		6	F	1●	59	1	Mr	3	·12
{ 8	Au	27	·80	6	O	25	·86	7	N	23	·90	**Pausha. Kshaya.**					2	D	23○	·42	**12**	3	Jr	21	·96	{ 5	F	20	49
{ 4	S	25	·84																							{ 7	Mr	21	02
2	S	14	·20	3	O	13	·73	5	N	12	·26	6	D	11○	·79	**13**	1	Jr	10	·32		2	F	8	·86	4	Mr	10	·38
6	S	3	·57	1	O	3	·10	2	N	1	·63	4	D	1	·16		5	D	30	·69	**14**	7	Jr	29	22	1	F	27	·75
5	S	22	·46	7	O	22○	·00	1	N	20●	·53	3	D	20	·06	**15**	4	Jr	18	·62		6	F	17	·12	7	Mr	18	65
2	S	11	·83	4	O	11○	·36	5	N	9	·90	7	D	9	·42	**16**	1	Jr	7	·96		3	F	6	48	5	Mr	7	·02
7	Au	31	·20	1	S	29○●	·73	3	O	29	·26	4	N	27	·79		6	D	27	·82	**17**	7	Jr	25	·85	2	F	24	·38
6	S	19●	·10	7	O	18	·63	2	N	17	·16	3	D	16	·69	**18**	5	Jr	15	·22		6	F	18○	·75	1	Mr	15	·28
3	S	8●	·46	4	O	7	·99	6	N	6	·52	1	D	6	·06	**19**	2	Jr	4	·59		4	F	8○	·12	5	Mr	4	·65
7	Au	28	·83	2	S	27	·36	3	O	26	·89	5	N	25	·42		6	D	24	95	**20**	1	Jr	28●	·48	3	F	22	·01
6	S	15	·73	1	O	15	·26	2	N	13	·79	4	D	13○	·32	**21**	5	Jr	11●	·85		7	F	10	38	1	Mr	11	91
4	S	5	·10	5	O	4	·63	7	N	3	·16	1	D	2○	·69	**22**	3	Jr	1	22		4	Jr	30	·75	6	Mr	1	·28
3	S	24	·00	4	O	23	·58	6	N	22○	·05	7	D	21	·58	**23**	2	Jr	20	12		3	F	18	·65	5	Mr	20	·18
7	S	13	·36	1	O	12	·89	3	N	11●	·42	4	D	10	·95	**24**	6	Jr	9	48		1	F	8	·01	2	Mr	8	·54
4	S	1	·78	6	O	1	·26	7	O	30	·79	2	N	29	·32		3	D	28	85	**25**	5	Jr	27	·38	6	F	25	·91
3	S	20○	·62	5	O	20	·16	6	N	18	69	1	D	18	·22	**26**	2	Jr	16	75		4	F	15	28	5	Mr	16○	·81
7	S	9○	·99	2	O	9	·52	4	N	8	05	5	D	7	·58	**27**	7	Jr	6	11		1	F	4	·64	3	Mr	6●	·18
5	Au	30●○	·36	6	S	28	·89	1	O	28	·42	2	N	26	·95		4	D	26	·48	**28**	6	Jr	25	01	7	F	23●	·54
4	S	17	·26	5	O	16	·79	7	N	15	·82	1	D	14	·85	**29**	3	Jr	13○	38		4	F	11	91	6	Mr	13	·44
1	S	6	62	3	O	6	·15	4	N	4	·68	6	D	4	·22	**30**	7	Jr	2○	·75		2	F	1	28	3	Mr	2	·81
{ 5	Au	26	99	2	O	25	·05	3	N	23	·58	5	D	23○	·11	**31**	6	Jr	21	·64		1	F	20	·17	2	Mr	21	70
{ 7	S	25	·52																										
4	S	14	·89	6	O	14	·42	7	N	12	·95	2	D	12●	·57	**32**	4	Jr	11	·01		5	F	9	·54	7	Mr	10	·07
2	S	3	26	3	O	2	·79	5	N	1○	·32	6	N	30	·85		1	D	30	·38	**33**	2	Jr	28	91	4	F	27	·44
1	S	22	·15	2	O	21○	·69	4	N	20	·21	5	D	19	·74	**34**	7	Jr	18	·28		1	F	16	·81	3	Mr	18	34
5	S	11	·52	7	O	11○	·05	1	N	9	·58	3	D	9	·11	**35**	4	Jr	7	64		6	F	6	·17	7	Mr	7	·70
2	Au	31	·89	4	S	30●	·42	5	O	29	·95	7	N	28	·48		2	D	28	01	**36**	3	Jr	26	·54	5	F	25○	·07
1	S	18●	·78	3	O	18	·32	4	N	16	·85	6	D	16	·38	**37**	7	Jr	14	·91		2	F	13●○	·44	3	Mr	14	·97
6	S	8	·15	7	O	7	·68	2	N	6	·21	3	D	5	·74	**38**	5	Jr	4	27		6	F	2●○	·80	1	Mr	4	·84
3	Au	28	·52	5	S	27	·05	6	O	26	58	1	N	25	·11		2	D	24○	64	**39**	4	Jr	23●	·17	5	F	21	·70
2	S	16	·42	3	O	15	·95	5	N	14	·48	7	D	14○	·01	**40**	1	Jr	12	54		3	F	11	07	4	Mr	11	60
6	S	4	·78	1	O	4	·31	2	N	2	·84	4	D	2○	·88		5	D	31	91	**41**	7	Jr	30	44	1	F	28	·97
5	S	23	·68	7	O	23	·21	1	N	21	·74	3	D	21	·27	**42**	4	Jr	19	80		6	F	18	·33	7	Mr	19	86
3	S	13	·05	4	O	12	·58	6	N	11●	·11	7	D	10	·64	**43**	2	Jr	9	·17		3	F	7	70	5	Mr	9	·23
7	S	2	·42	1	O	1○	95	3	O	31	·48	5	N	30	·01		6	D	29	54	**44**	1	Jr	28	07	2	F	26	60
6	S	20●○	.31	7	O	19	84	2	N	18	37	3	D	17	90	**45**	5	Jr	16	44		6	F	14	·98	1	Mr	16	50
3	S	9●○	·68	5	O	9	·21	6	N	7	·74	1	D	7	·27	**46**	2	Jr	5	80		4	F	4	83	5	Mr	5●	·86
1	Au	30	05	2	S	28	·58	4	O	28	·11	5	N	26	·64		7	D	26	17	**47**	1	Jr	24○	70	3	F	23	28
6	S	17	·94	1	O	17	·48	3	N	16	·01	4	D	15	·54	**48**	6	Jr	14○	07		7	F	12	60	2	Mr	13	·13
4	S	6	31	5	O	5	84	7	N	4	·37	1	D	3	·90	**49**	3	Jr	2○	43		4	Jr	31	96	6	Mr	2	·50
{ 1	Au	26	·68	4	O	24	74	6	N	23	·27	7	D	22●	·80	**50**	2	Jr	21	38		3	F	19	86	5	Mr	21	·89
{ 3	S	25	·21																										
7	S	14	58	2	O	14	·11	3	N	12○	·64	3	D	12	·17	**51**	6	Jr	10	·70		1	F	9	23	2	Mr	10	76
4	S	3	·94	6	O	3	·47	1	N	2○	00	2	D	1	·54		4	D	31	07	**52**	5	Jr	29	60	7	F	28	·13
3	S	21	·84	5	O	21○	·37	6	N	19	·90	1	D	19	·48	**53**	2	Jr	17	·96		4	F	16	·49	6	Mr	18	·02
1	S	11	·21	2	O	10	74	4	N	9	·27	5	D	8	·80	**54**	7	Jr	7	83		1	F	5	86	3	Mr	7○	89
5	Au	31○	·58	7	S	30	11	1	O	29	·64	3	N	28	·17		4	D	27	70	**55**	6	Jr	26	·23	7	F	24●○	76
4	S	19	·47	6	O	19	·00	7	N	17	·53	2	D	17	·06	**56**	3	Jr	15	60		5	F	14○	·13	6	Mr	14	·66
1	S	7	·84	3	O	7	·37	4	N	5	·90	6	D	5	·43	**57**	7	Jr	3○	·96		2	F	2	49	4	Mr	4	·02
6	Au	28	·21	7	S	26	·74	2	O	26	·27	3	N	24	·80		5	D	24○	·83	**58**	6	Jr	22	·86	1	F	21	·39

A.D. 999 see pages 238 to 241 below

For tithis by Brahma siddhānta add algebraically —·04 to the above.

TABLE II.—Solar years and new moons

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era.	Vaiśākha. Week-day.	Month.	Day.	Fraction.	Jyeshṭha. Week-day.	Month.	Day.	Fraction.	Āshāḍha. Week-day.	Month.	Day.	Fraction.	Śrāvaṇa. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day.	Month.	Day.	Fraction.
							A.D.																				
4059	1015	880	22M	·8368	0·08538	14·665	**958**	2 4	Mr Ap	22 21	·92 ·45	5	My	20	·98	7	Je	19○	·51	2	Jl	19●	·04	3	Au	17	·57
4060	1016	881	23M	·0955	18·72508	12·800	**959**	1	Ap	10	·82	3	My	10	·35	4	Je	8●○	·88	6	Jl	8	·41	7	Au	6	·94
4061	1017	882	22M	·3542	7·83291	8 957	**960**	6	Mr	30	·19	7	Ap	28	·72	2	My	28●	·25	3	Je	26	·78	5 6	Jl Au	26 24	·31 ·84
4062	1018	883	22M	·6128	26·47194	7·101	**961**	5	Ap	18○	·08	6	My	17●	·61	1	Je	16	·14	2	Jl	15	·68	4	Au	14	·21
4063	1019	884	22M	·8715	15·58037	3·248	**962**	2	Ap	7○	·45	3	My	6	·98	5	Je	5	·51	7	Jl	5	·04	1	Au	3	·57
4064	1020	885	23M	·1302	4·68880	26 961	**963**	6	Mr	27○	·82	1	Ap	26	·35	2 4	My Je	25 24	·88 ·41	5	Jl	23	·94	7	Au	22	47
4065	1021	886	22M	·8889	23 32783	25·094	**964**	5	Ap	14	·72	7	My	14	·25	1	Je	12	·78	3	Jl	12	·81	4	Au	10	84
4066	1022	887	22M	·6476	12·43627	21·252	**965**	3	Ap	4	·08	4	My	3	·61	6	Je	2	·14	7	Jl	1	·67	2	Jl	31○	·20
4067	1023	888	22M	·9062	1·54469	17·410	**966**	7	Mr	24	·15	1 3	Ap My	22 22	·98 ·51	5	Je	21	·04	6	Jl	20○	·57	1	Au	19	·10
4068	1024	889	23M	·1649	20·18373	15·544	**967**	6	Ap	12	·35	7	My	11	·88	2	Je	10	·41	3	Jl	9●	·94	5	Au	8	·47
4069	1025	890	22M	·4236	9·29216	11·701	**968**	3	Mr	31	·71	5	Ap	30	·24	6	My	29○	·78	1	Je	28	31	2	Jl	27	·84
4070	1026	891	22M	·6823	27·93118	9·835	**969**	2	Ap	19	61	4	My	19○	·14	5	Je	17	·67	7	Jl	17	·20	1	Au	15	73
4071	1027	892	22M	·9410	17 08962	5·993	**970**	6	Ap	8	·98	1	My	8●○	·51	3	Je	7	·04	4	Jl	6	·57	6	Au	5	10
4072	1028	893	23M	.1996	6·14815	2·151	**971**	4	Mr	29	·35	5	Ap	27	·88	7	My	27	41	1 3	Je Jl	25 25	.94 ·47	5	Au	24	·00
4073	1029	894	22M	·4583	24 78707	0·284	**972**	3	Ap	16●	·24	4	My	15	·77	6	Je	14	·30	7	Jl	13	·84	2	Au	12	·37
4074	1030	895	22M	·7170	13·89551	23·997	**973**	7	Ap	5	·61	2	My	5	·14	3	Je	3	·67	5	Jl	3	·20	6	Au	1	·73
4075	1031	896	22M	·9757	3·00395	20·154	**974**	4	Mr	25	·98	6 1	Ap My	24 24	·51 ·04	2	Je	22	·57	4	Jl	22	·10	5	Au	20●	·63
4076	1032	897	23M	·2344	21·64287	18·288	**975**	3	Ap	13	·88	5	My	13	·41	6	Je	11	·94	1	Jl	11	·47	3	Au	10●	·00
4077	1033	898	22M	·4980	10·75140	14·446	**976**	1	Ap	2	·24	2	My	1	·77	4	My	31	·30	5	Je	29○	·83	7	Jl	29	·36
4078	1034	899	22M	·7517	29 89043	12·580	**977**	7	Ap	21	·14	1	My	20	·67	3	Je	19○	·20	4	Jl	18	·73	6	Au	17	·26
4079	1035	900	23M	·0104	18·49886	8·737	**978**	4	Ap	10	·51	6	My	10	·04	7	Je	8●	·57	2	Jl	8	·10	3	Au	6	·63
4080	1036	901	23M	·2691	7·60730	4·895	**979**	1	Mr	30	·87	3	Ap	29○	·40	4	My	28	·94	6 1	Je Jl	27 27	·47 ·00	2	Au	25	·53
4081	1037	902	22M	·5278	26·24633	3·029	**980**	7	Ap	17○	·77	2	My	17●	·30	3	Je	15	·83	5	Jl	15	·36	6	Au	13	·89
4082	1038	903	22M	·7864	15·35476	26·741	**981**	5	Ap	7●○	·14	6	My	6	·67	1	Je	5	·20	2	Jl	4	·73	4	Au	3	·26
4083	1039	904	23M	·0451	4·46319	22·899	**982**	2	Mr	27●	·51	4	Ap	26	·04	5 7	My Je	25 24	·57 ·10	1	Jl	23	·63	3	Au	22	·16
4084	1040	905	23M	·3038	23·10222	21·038	**983**	1	Ap	15	·40	2	My	14	·93	4	Je	13	·46	6	Jl	13	·00	7	Au	11○	·53
4085	1041	906	22M	·5625	12·21065	17·190	**984**	5	Ap	3	·77	7	My	3	·30	1	Je	1	·83	3	Jl	1	·36	4	Jl	30○●	·89
4086	1042	907	22M	·8212	1·31909	13·348	**985**	3	Mr	24	·14	4 6	Ap My	22 22	·67 ·20	7	Je	20	·73	2	Jl	20○	·26	3	Au	18	·79
4087	1043	908	23M	·0799	19·95812	11·482	**986**	2	Ap	12	·03	3	My	11	·58	5	Je	10○	·10	6	Jl	9	·63	1	Au	8	·16
4088	1044	909	23M	·3385	9·06654	7·640	**987**	6	Ap	1	·40	7	Ap	30	·93	2	My	30○	·46	3	Je	28	·99	5	Jl	28	·52
4089	1045	910	22M	·5972	27·70557	5·773	**988**	5	Ap	19	·30	6	My	18●○	·83	1	Je	17	·36	2	Jl	16	·89	4	Au	15	·42
4090	1046	911	22M	·8559	16·81401	1·931	**989**	2	Ap	8●	·67	4	My	8●	·20	5	Je	6	·73	7	Jl	6	·26	1	Au	4	·79
4091	1047	912	23M	·1146	5·92244	25·643	**990**	7	Mr	29○	·03	1	Ap	27	·56	3	My	27	·09	4 6	Je Jl	25 25	·62 ·16	7	Au	23	·69
4092	1048	913	23M	·3733	24·56147	23·777	**991**	5	Ap	16	·93	7	My	16	·46	1	Je	14	·99	3	Jl	14	·52	5	Au	13	·05
4093	1049	914	22M	·6319	13·66991	19·935	**992**	3	Ap	5	·30	4	My	4	·83	6	Je	3	·36	7	Jl	2	·89	2	Au	1	·42
4094	1050	915	22M	·8906	2·77838	16·093	**993**	7	Mr	25	·66	2 3	Ap My	24 23	20 ·73	5	Je	22	·26	6	Jl	21	·79	1	Au	20●	·32
4095	1051	916	23M	·1493	21·41764	14·227	**994**	6	Ap	13	·56	1	My	13	·10	2	Je	11	·62	4	Jl	11○	·15	5	Au	9	·68
4096	1052	917	23M	·4080	10·52511	10·885	**995**	3	Ap	2	·93	5	My	2	·46	6	My	31	·99	1	Je	30○	·52	3	Jl	*30	·05
4097	1053	918	22M	·6667	29·16482	8·518	**996**	2	Ap	20	·83	4	My	20	·36	5	Je	18	·89	7	Jl	18	·42	1	Au	16	·95
4098	1054	919	22M	·9253	18·27826	4·676	**997**	7	Ap	10	·19	1	My	9○	·72	3	Je	8	·26	4	Jl	7	·79	6	Au	6	·32
4099	1055	920	23M	·1840	7·38169	0·833	**998**	4	Mr	30	·56	6	Ap	29○	·09	7	My	28	·62	2 3	Je Jl	27 26	·15 ·68	5	Au	25	21
4100	1056	921	23M	·4427	26·02072	26·522	**999**	3	Ap	18○	·46	4	My	17	·99	6	Je	16	·52	1	Jl	16	·05	2	Au	14	·58

* For Sūrya siddhānta figures for A.D. 500 to
Ending moments of tithis are the same for Ārya and Sūrya siddhāntas.

from A.D. 500 to A.D. 999 (Ārya siddhānta)*—cont.

Āśvina. Week-day.	Month.	Day.	Fraction.	Kārttika. Week-day	Month.	Day.	Fraction.	Mārgaśīrsha. Week-day.	Month	Day.	Fraction.	Pausha. Week-day.	Month.	Day.	Fraction	A.D.	Māgha. Week-day.	Month.	Day.	Fraction	A.D.	Phālguna. Week-day.	Month.	Day.	Fraction.	Chaitra. Week-day.	Month	Day.	Fraction.
5	S	16	10	6	O	15	64	1	N	14	·17	2	D	13●○	·70	**59**	4	Jr	12	·23		5	F	10	·76	7	Mr	12	·29
2	S	5	47	4	O	5	00	5	N	3	53	7	D	3	06	**60**	1	Jr	1	·59		3	Jr	31	·12	4	F	29	·66
1	S	28	·87	2	O	22	·90	4	N	21	43	5	D	20	·96	**61**	7	Jr	19	·49		2	F	18	·02	3	Mr	19	·55
5	S	12	74	7	O	12○	·27	1	N	10	80	3	D	10	·33	**62**	4	Jr	8	·86		6	F	7	·39	7	Mr	8	·92
3	S	2	·10	4	O	1○	·63	6	O	31	·16	7	N	29	70		2	D	29	23	**63**	3	Jr	27	·76	5	F	26	·29
2	S	21○	·00	3	O	20	53	5	N	19	·06	6	D	18	·59	**64**	1	Jr	17	12		2	F	15	·65	4	Mr	16	·18
6	S	9	37	7	O	8	·90	2	N	7	43	3	D	6	96	**65**	5	Jr	5	49		7	F	4○	·02	1	Mr	5●	·55
3	Au	29	·74	5	S	28	27	6	O	27	·80	1	N	26	·33		2	D	25	86	**66**	4	Jr	24○	·39	5	F	22	·92
2	S	17	·63	4	O	17	16	5	N	15	69	7	D	15	·22	**67**	1	Jr	13○	76		3	F	12	·29	4	Mr	18	·82
7	S	7	00	1	O	6	58	3	N	5	·06	4	D	4	·59	**68**	6	Jr	3	12		7	F	1	·65	2	Mr	2	·18
4 5	Au S	26 24	87 90	7	O	24	43	1	N	22○	·96	3	D	22●	·49	**69**	5	Jr	21	·02		6	F	19	·55	1	Mr	21	·08
3	S	14	26	4	O	18	80	6	N	12○	33	7	D	11	·87	**70**	2	Jr	10	39		3	F	8	·92	5	Mr	10	·45
7	S	3	·63	2	O	3	·16	3	N	1●○	·69	5	D	1	·22		6	D	30	·75	**71**	1	Jr	29	·28	2	F	27	·82
6	S	22	53	1	O	22●	·06	2	N	20	·56	4	D	20	12	**72**	5	Jr	18	·65		7	F	17	·18	1	Mr	17○	·71
3	S	10○	90	5	O	10●	43	6	N	8	96	1	D	8	·49	**73**	3	Jr	7	·02		4	F	5	·55	6	Mr	7○	·08
1	Au	31○	·26	2	S	29	79	4	O	29	·32	5	N	27	86		7	D	27	39	**74**	1	Jr	25	·92	3	F	24●○	45
7	S	19	·16	1	O	18	·69	3	N	17	·22	4	D	16	75	**75**	6	Jr	15	·28		7	F	13●	·81	2	Mr	15	·34
4	S	8	53	6	O	8	06	7	N	6	·59	2	D	6	12	**76**	3	Jr	4○	·65		5	F	3	·18	6	Mr	3	71
1	Au	27	90	3	S	26	43	4	O	25	96	6	N	24	·49		1	D	24○	·02	**77**	2	Jr	22	·55	4 5	F Mr	21 22	·08 ·61
7	S	15	·79	2	O	15	·32	3	N	18	·85	5	D	18●	·39	**78**	6	Jr	11	·91		1	F	10	·45	2	Mr	11	·98
5	S	5	·16	6	O	4	·69	1	N	3	·22	2	D	2●	·75	**79**	4	Jr	1	·28		5	Jr	30	·81	7	Mr	1	·34
4	S	24	·06	5	O	23○	·59	7	N	22	·12	1	D	21	·65	**80**	3	Jr	20	·18		4	F	18	·71	6	Mr	19	·24
1	S	12	·42	2	O	11○	·96	4	N	10	·49	6	D	10	·02	**81**	7	Jr	8	·55		2	F	7	08	3	Mr	8	·61
5	S	1	·79	7	O	1○	·32	1	O	30	·85	3	N	29	·38		4	D	28	·91	**82**	6	Jr	27	·44	7	F	25	·98
4	S	20●	·69	6	O	20	·22	7	N	18	·75	2	D	18	·28	**83**	3	Jr	16	·81		5	F	15○	·34	6	Mr	16	·87
2	S	10	·06	3	O	9	·59	5	N	8	·12	6	D	7	·65	**84**	1	Jr	6	·18		2	F	4○	·71	4	Mr	5	·24
6	Au	29	·42	7	S	27	·95	2	O	27	·48	4	N	26	·02		5	D	25	·55	**85**	7	Jr	24○	·08	1	F	22	·61
5	S	17	·32	6	O	16	·85	1	N	15	·38	2	D	14	·91	**86**	4	Jr	30●	·44		5	F	11	·97	7	Mr	18	·50
2	S	6	·69	4	O	6	·22	5	N	4	·75	7	D	4○	·28	**87**	1	Jr	2	·81		3	F	1	·34	4	Mr	2	·87
7 1	Au S	27 25	·05 ·58	3	O	25	·12	4	N	23○	·65	6	D	23	·18	**88**	7	Jr	21	·71		2	F	20	·24	3	Mr	20	·77
5	S	13	·96	7	O	13	·48	2	N	12●○	·01	3	D	11	·54	**89**	5	Jr	10	·07		6	F	8	·60	1	Mr	10	·14
3	S	3	·32	4	O	2	·84	6	N	1●	·88	7	N	30	·91		2	D	30	·44	**90**	3	Jr	28	·97	5	F	27	·50
2	S	22○	·22	3	O	21●	·75	5	N	20	·28	6	D	19	·81	**91**	1	Jr	18	·34		2	F	16	·87	4	Mr	18●○	·40
6	S	11○	·58	1	O	11	·11	2	N	9	·64	4	D	9	·18	**92**	5	Jr	7	·71		7	F	6	·24	1	Mr	6●○	·77
3	Au	30○	·95	5	S	29	·48	7	O	29	·01	1	N	27	·54		3	D	27	·07	**93**	4	Jr	25	·60	6	F	24●	·13
2	S	18	·85	4	O	18	·38	5	N	16	·91	7	D	16	·44	**94**	1	Jr	14○	·97		3	F	13	·50	5	Mr	15	·03
7	S	8	·22	1	O	7	·75	3	N	6	·28	4	D	5	·81	**95**	6	Jr	4●○	·34		7	F	2	·87	2	Mr	4	·40
4	Au	28	·58	6	S	27	·11	7	O	26	·64	2	N	25	·17		3	D	24	·70	**96**	5	Jr	23	·24	6 1	F Mr	21 22	·77 ·30
3	S	15	·48	5	O	15	·01	6	N	13	·54	1	D	13●	·07	**97**	2	Jr	11	·60		4	F	10	·13	5	Mr	11	·66
7	S	4	·85	2	O	4	·38	3	N	2○	·91	5	D	2	·44		6	D	31	·97	**98**	1	Jr	30	·50	3	Mr	1	·08
6	S	23	·74	1	O	23●○	·28	2	N	21	·81	4	D	21	·34	**99**	5	Jr	19	·87		7	F	18	·40	1	Mr	19	·93
4	S	13	·11	5	O	12●○	·64	7	N	11	·17	1	D	10	·70	**00**	3	Jr	9	·23	**00**	4	F	7	·76	6	Mr	8	·80

A.D. 999 see pages 238 to 241 below.
For tithis by Brahma siddhānta add algebraically — ·05 to the above.

TABLE II.— Sûrya siddhânta figures.

A.D.	Kaliyuga.	Week-day of 1st January.	Commencement of Indian solar year. Day	Fraction of day	First new moon in solar year.	Anomaly of first new moon.	A.D.	Kaliyuga.	Week-day of 1st January.	Commencement of Indian solar year. Day	Fraction of day	First new moon in solar year	Anomaly of first new moon.	A.D.	Kaliyuga.	Week-day of 1st January.	Commencement of Indian solar year. Day	Fraction of day
500	3601	7	18M	3618	27·3063	9·979	**560**	3661	5	18M	·8867	28·4772	15·769	**620**	3721	4	19M	·4121
501	3602	1	18M	·6200	16·4146	6·187	**561**	3662	7	19M	·1454	12·5854	11·926	**621**	3722	5	19M	6708
502	3603	2	18M	·8788	5·5229	2·294	**562**	3663	1	19M	·4042	1·6937	8·083	**622**	3723	6	19M	·9296
503	3604	4	19M	·1375	25·1618	0·427	**563**	3664	2	19M	·6629	20·3326	6·216	**623**	3724	1	20M	·1884
504	3605	5	18M	·3963	13·2701	24·139	**564**	3665	3	18M	·9217	9·4409	2·374	**624**	3725	2	19M	·4471
505	3606	6	18M	·6550	2·3784	20·296	**565**	3666	5	19M	·1805	28·0798	0·507	**625**	3726	3	19M	7059
506	3607	7	18M	·9138	21·0173	18·429	**566**	3667	6	19M	·4392	17·1881	24·219	**626**	3727	4	19M	·9646
507	3608	2	19M	·1726	10·1256	14·587	**567**	3668	7	19M	·6980	6·2964	20·376	**627**	3728	6	20M	·2234
508	3609	3	18M	·4313	28·7644	12·720	**568**	3669	1	18M	·9597	24·9353	18·509	**628**	3729	7	19M	·4821
509	3610	4	18M	·6901	17·8727	8·877	**569**	3670	3	19M	·2155	14·0436	14·666	**629**	3730	1	19M	·7409
510	3611	5	18M	·9488	6·9810	5·034	**570**	3671	4	19M	·4742	3·1519	10·824	**630**	3731	2	19M	·9996
511	3612	7	19M	·2076	25·6199	3·168	**571**	3672	5	19M	·7330	21·7908	8·957	**631**	3732	4	20M	·2584
512	3613	1	18M	·4663	14·7282	26·880	**572**	3673	6	18M	·9918	10·8991	5·114	**632**	3733	5	19M	·5172
513	3614	2	18M	·7251	3·8365	23·037	**573**	3674	1	19M	2505	0·0074	1·271	**633**	3734	6	19M	·7759
514	3615	3	18M	·9869	22·4754	21·170	**574**	3675	2	19M	·5093	18·6468	26·959	**634**	3735	1	20M	·0347
515	3616	5	19M	·2426	11·5837	17·327	**575**	3676	3	19M	·7680	7·7546	23·117	**635**	3736	2	20M	2934
516	3617	6	18M	·5014	0·6920	13·485	**576**	3677	5	19M	0268	26·3935	21·250	**636**	3737	3	19M	·5522
517	3618	7	18M	·7601	19·3309	11·618	**577**	3678	6	19M	·2855	15·5018	17·407	**637**	3738	4	19M	·8109
518	3619	2	19M	·0189	8·4392	7·775	**578**	3679	7	19M	·5443	4·6101	13·564	**638**	3739	6	20M	·0697
519	3620	3	19M	·2776	27·0781	5·908	**579**	3680	1	19M	·8031	23·2489	11·698	**639**	3740	7	20M	·3285
520	3621	4	18M	·5364	16·1864	2·066	**580**	3681	3	19M	0618	12·3572	7·855	**640**	3741	1	19M	5872
521	3622	5	18M	·7952	5·2947	25·777	**581**	3682	4	19M	·3206	1·4655	4·013	**641**	3742	2	19M	·8460
522	3623	7	19M	·0569	23·9336	23·911	**582**	3683	5	19M	5793	20·1044	2·145	**642**	3743	4	20M	·1047
523	3624	1	19M	·3127	13·0419	20·068	**583**	3684	6	19M	·8381	9·2127	25·857	**643**	3744	5	20M	·3635
524	3625	2	18M	·5714	2·1502	16·225	**584**	3685	1	19M	·0958	27·8516	23·990	**644**	3745	6	19M	·6222
525	3626	3	18M	·8302	20·7891	14·358	**585**	3686	2	19M	3556	16·9599	20·148	**645**	3746	7	19M	8810
526	3627	5	19M	·0889	9·8974	10·516	**586**	3687	3	19M	·6143	6·0682	16·305	**646**	3747	2	20M	·1298
527	3628	6	19M	·3477	28·5362	8·649	**587**	3688	4	19M	8731	24·7071	14·438	**647**	3748	3	20M	·3985
528	3629	7	18M	·6065	17·6445	4·806	**588**	3689	6	19M	1319	13·8154	10·595	**648**	3749	4	19M	·6573
529	3630	1	18M	·8652	6·7528	0·963	**589**	3690	7	19M	·3906	2·9237	6·753	**649**	3750	5	19M	9163
530	3631	3	19M	·1240	25·3917	26·651	**590**	3691	1	19M	·6491	21·5626	4·886	**650**	3751	7	20M	·1748
531	3632	4	19M	3827	14·5000	22·809	**591**	3692	2	19M	9081	10·6709	1·043	**651**	3752	1	20M	·4335
532	3633	5	18M	·6415	3·6088	18·966	**592**	3693	4	19M	·1669	29·3098	26·731	**652**	3753	2	19M	·6923
533	3634	6	18M	·9002	22·2472	17·099	**593**	3694	5	19M	·4256	18·4181	22·888	**653**	3754	3	19M	·9511
534	3635	1	19M	·1590	11·3555	13·256	**594**	3695	6	19M	·6844	7·5264	19·045	**654**	3755	5	20M	·2098
535	3636	2	19M	·4177	0·4638	9·414	**595**	3696	7	19M	9432	26·1653	17·179	**655**	3756	6	20M	4686
536	3637	3	18M	·6765	19·1027	7·547	**596**	3697	2	19M	·2019	15·2736	13·336	**656**	3757	7	19M	7273
537	3638	4	18M	·9353	8·2110	3·704	**597**	3698	3	19M	·4607	4·3819	9·493	**657**	3758	1	19M	·9861
538	3639	6	19M	·1940	26·8499	1·837	**598**	3699	4	19M	·7194	23·0207	7·627	**658**	3759	3	20M	·2448
539	3640	7	19M	·4518	15·9582	25·549	**599**	3700	5	19M	·9782	12·1290	3·784	**659**	3760	4	20M	·5036
540	3641	1	18M	·7115	5·0665	21·706	**600**	3701	7	19M	·2369	1·2873	27·496	**660**	3761	5	19M	·7623
541	3642	2	18M	·9703	23·7054	19·840	**601**	3702	1	19M	·4957	19·8762	25·629	**661**	3762	7	20M	·0211
542	3643	4	19M	·2290	12·8137	16·997	**602**	3703	2	19M	·7545	8·9845	21·786	**662**	3763	1	20M	·2799
543	3644	5	19M	·4868	1·9220	12·154	**603**	3704	4	20M	·0132	27·6281	19·919	**663**	3764	2	20M	·5386
544	3645	6	18M	·7466	20·5608	10·277	**604**	3705	5	19M	·2720	16·7317	16·077	**664**	3765	3	19M	7974
545	3646	1	19M	·0053	9·6691	6·445	**605**	3706	6	19M	·5307	5·8400	12·234	**665**	3766	5	20M	·0561
546	3647	2	19M	·2641	28·3080	4·578	**606**	3707	7	19M	·7895	24·4789	10·367	**666**	3767	6	20M	3149
547	3648	3	19M	5228	17·4163	0·735	**607**	3708	2	20M	·0482	13·5872	6·524	**667**	3768	7	20M	·5737
548	3649	4	18M	7816	6·5246	24·447	**608**	3709	3	19M	3070	2·6955	2·681	**668**	3769	1	19M	·8324
549	3650	6	19M	·0403	25·1635	22·580	**609**	3710	4	19M	·5658	21·3844	0·815	**669**	3770	3	20M	·0912
550	3651	7	19M	·2991	14·2718	18·737	**610**	3711	5	19M	·8245	10·4427	24·527	**670**	3771	4	20M	·3499
551	3652	1	19M	5579	3·3801	14·894	**611**	3712	7	20M	·0833	29·0816	22·660	**671**	3772	5	20M	·6087
552	3653	2	18M	·8166	22·0190	13·028	**612**	3713	1	19M	·3420	18·1899	18·817	**672**	3773	6	19M	8674
553	3654	4	19M	·0754	11·1278	9·185	**613**	3714	2	19M	·6008	7·2982	14·974	**673**	3774	1	20M	·1262
554	3655	5	19M	·3341	0·2856	5·348	**614**	3715	3	19M	·8595	25·9370	13·107	**674**	3775	2	20M	·3850
555	3656	6	19M	·5929	18·8745	3·476	**615**	3716	5	20M	·1183	15·0453	9·265	**675**	3776	3	20M	·6437
556	3657	7	18M	·8516	7·9828	27·188	**616**	3717	6	19M	·3771	4·1536	5·423	**676**	3777	4	19M	·9025
557	3658	2	19M	·1104	26·6217	25·321	**617**	3718	7	19M	·6358	22·7925	3·555	**677**	3778	6	20M	·1612
558	3659	3	19M	·3692	15·7800	21·478	**618**	3719	1	19M	·8946	11·9008	27·267	**678**	3779	7	20M	·4200
559	3660	4	19M	·6279	4.8388	17·635	**619**	3720	3	20M	·1533	1·0091	23·425	**679**	3780	1	20M	·6787

for A.D. 500 to A.D. 999.

First new moon in solar year.	Anomaly of first new moon.	A.D.	Kaliyuga.	Week-day of 1st January.	Commencement of Indian solar year. Day.	Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	A.D.	Kaliyuga.	Week-day of 1st January.	Commencement of Indian solar year. Day.	Fraction of day.	First new moon in solar year.	Anomaly of first new moon.
19·6480	21·558	**680**	3781	2	19M	·9375	15·8189	27·347	**740**	3841	1	20M	·4629	11·9897	5·582
8·7563	17·715	**681**	3782	4	20M	·1962	4·9272	23·504	**741**	3842	2	20M	·7217	1·0980	1·789
27·3952	15·848	**682**	3783	5	20M	·4550	23·5661	21·638	**742**	3843	3	20M	·9804	19·7369	27·427
16·5035	12·006	**683**	3784	6	20M	·7138	12·6744	17·795	**743**	3844	5	21M	·2392	8·8452	23·584
5·6118	8·163	**684**	3785	7	19M	·9725	1·7827	13·952	**744**	3845	6	20M	·4979	27·4841	21·717
24·2507	6·296	**685**	3786	2	20M	·2313	20·4216	12·085	**745**	3846	7	20M	·7567	16·5924	17·875
13·3590	2·453	**686**	3787	3	20M	·4900	9·5299	8·242	**746**	3847	1	21M	·0154	5·7007	14·032
2·4673	26·165	**687**	3788	4	20M	·7488	28·1687	6·376	**747**	3848	3	21M	·2742	24·3396	12·165
21·1062	24·298	**688**	3789	5	20M	·0075	17·2770	2·533	**748**	3849	4	20M	·5330	13·4479	8·322
10·2145	20·456	**689**	3790	7	20M	·2663	6·3853	26·245	**749**	3850	5	20M	·7917	2·5562	4·480
28·8534	18·589	**690**	3791	1	20M	·5251	25·0242	24·378	**750**	3851	7	21M	·0505	21·1951	2·613
17·9617	14·746	**691**	3792	2	20M	·7838	14·1325	20·535	**751**	3852	1	21M	·3092	10·3034	26·325
7·0700	10·903	**692**	3793	4	20M	·0426	3·2408	16·693	**752**	3853	2	20M	·5680	28·9423	24·458
25·7088	9·037	**693**	3794	5	20M	·3013	21·8797	14·826	**753**	3854	3	20M	·8267	18·0506	20·615
14·8171	5·194	**694**	3795	6	20M	·5601	10·9808	10·983	**754**	3855	5	21M	·0855	7·1589	16·772
3·9254	1·351	**695**	3796	7	20M	·8188	0·0963	7·140	**755**	3856	6	21M	·3443	25·7978	14·906
22·5643	27·089	**696**	3797	2	20M	·0776	18·7352	5·274	**756**	3857	7	20M	·6030	14·9061	11·063
11·6726	23·196	**697**	3798	3	20M	·3364	7·8435	1·431	**757**	3858	1	20M	·8618	4·0144	7·220
0·7809	19·354	**698**	3799	4	20M	·5951	26·4824	27·119	**758**	3859	3	21M	·1205	22·6532	5·353
19·4198	17·487	**699**	3800	5	20M	·8539	15·5907	23·276	**759**	3860	4	21M	·3793	11·7615	1·511
8·5281	13·644	**700**	3801	7	20M	·1126	4·6990	19·433	**760**	3861	5	20M	·6380	0·8698	25·223
27·1670	11·777	**701**	3802	1	20M	·3714	23·3379	17·567	**761**	3862	6	20M	·8968	19·5087	23·356
16·2753	7·935	**702**	3803	2	20M	·6301	12·4462	13·724	**762**	3863	1	21M	·1556	8·6170	19·513
5·3836	4·093	**703**	3804	3	20M	·8889	1·5545	9·881	**763**	3864	2	21M	·4143	27·2559	17·646
24·0225	2·225	**704**	3805	5	20M	·1477	20·1933	8·014	**764**	3865	3	20M	·6731	16·3642	13·804
13·1308	25·937	**705**	3806	6	20M	·4064	9·3016	4·172	**765**	3866	4	20M	·9318	5·4725	9·961
2·2391	22·094	**706**	3807	7	20M	·6652	27·9405	2·305	**766**	3867	6	21M	·1906	24·1114	8·094
20·8780	20·227	**707**	3808	1	20M	·9209	17·0488	26·017	**767**	3868	7	21M	·4493	13·2197	4·251
9·9863	16·384	**708**	3809	3	20M	·1827	6·1571	22·174	**768**	3869	1	20M	·7081	2·3280	0·409
28·6251	14·518	**709**	3810	4	20M	·4414	24·7960	20·307	**769**	3870	2	20M	·9668	20·9669	26·096
17·7334	10·675	**710**	3811	5	20M	·7002	13·9043	16·464	**770**	3871	4	21M	·2256	10·0752	22·254
6·8417	6·833	**711**	3812	6	20M	·9590	3·0126	12·622	**771**	3872	5	21M	·4844	28·7141	20·387
25·4806	4·966	**712**	3813	1	20M	·2177	21·6515	10·755	**772**	3873	6	20M	·7431	17·8224	16·544
14·5889	1·123	**713**	3814	2	20M	·4765	10·7598	6·912	**773**	3874	7	21M	·0019	6·9307	12·701
3·6972	24·835	**714**	3815	3	20M	·7352	29·3987	5·045	**774**	3875	2	21M	·2606	25·5696	10·835
22·3361	22·968	**715**	3816	4	20M	·9940	18·5070	1·203	**775**	3876	3	21M	·5194	14·6779	6·992
11·4444	19·125	**716**	3817	6	20M	·2527	7·6153	24·914	**776**	3877	4	20M	·7781	3·7862	3·149
0·5527	15·283	**717**	3818	7	20M	·5115	26·2542	23·048	**777**	3878	6	21M	·0369	22·4250	1·282
19·1916	13·416	**718**	3819	1	20M	·7703	15·3625	19·205	**778**	3879	7	21M	·2957	11·5333	24·994
8·2999	9·573	**719**	3820	3	21M	·0290	4·4708	15·362	**779**	3880	1	21M	·5544	0·6416	21·152
26·9388	7·706	**720**	3821	4	20M	·2878	23·1097	13·495	**780**	3881	2	20M	·8132	19·2805	19·284
16·0471	3·864	**721**	3822	5	20M	·5465	12·2180	9·653	**781**	3882	4	21M	·0719	8·3888	15·442
5·1554	0·021	**722**	3823	6	20M	·8053	1·3263	5·810	**782**	3883	5	21M	·3307	27·0277	13·575
23·7943	25·709	**723**	3824	1	21M	·0640	19·9651	3·943	**783**	3884	6	21M	·5894	16·1360	9·733
12·9026	21·866	**724**	3825	2	20M	·3228	9·0734	0·100	**784**	3885	7	20M	·8482	5·2443	5·890
2·0109	18·023	**725**	3826	3	20M	·5185	27·7123	25·788	**785**	3886	2	21M	·1070	23·8832	4·028
20·6498	16·156	**726**	3827	4	20M	·8403	16·8206	21·946	**786**	3887	3	21M	·3657	12·9915	0·180
9·7581	12·314	**727**	3828	6	21M	·0991	5·9289	18·103	**787**	3888	4	21M	·6245	2·0998	23·892
28·3969	10·447	**728**	3829	7	20M	·3578	24·5678	16·236	**788**	3889	5	20M	·8832	20·7387	22·025
17·5052	6·604	**729**	3830	1	20M	·6166	13·6761	12·393	**789**	3890	7	21M	·1420	9·8470	18·183
6·6135	2·761	**730**	3831	2	20M	·8753	2·7844	8·551	**790**	3891	1	21M	·4007	28·4859	16·316
25·2524	0·895	**731**	3832	4	21M	·1341	21·4233	6·674	**791**	3892	2	21M	·6595	17·5942	12·473
14·3607	24·606	**732**	3833	5	20M	·3928	10·5316	2·841	**792**	3893	3	20M	·9183	6·7025	8·630
3·4690	20·764	**733**	3834	6	20M	·6516	29·1705	0·974	**793**	3894	5	21M	·1770	25·3418	6·764
22·1079	18·897	**734**	3835	7	20M	·9104	18·2788	24·686	**794**	3895	6	21M	·4358	14·4496	2·921
11·2162	15·054	**735**	3836	2	21M	·1691	7·3871	20·843	**795**	3896	7	21M	·6945	3·5579	26·683
0·3245	11·212	**736**	3837	3	20M	·4279	26·0260	18·976	**796**	3897	1	20M	·9533	22·1963	24·766
18·9634	9·345	**737**	3838	4	20M	·6866	15·1343	15·134	**797**	3898	3	21M	·2120	11·3051	20·923
8·0717	5·502	**738**	3839	5	20M	·9454	4·2426	11·291	**798**	3899	4	21M	·4708	0·4134	17·080
26·7106	3·635	**739**	3840	7	21M	·2041	22·8815	9·424	**799**	3900	5	21M	·7296	19·0523	15·214

TABLE II.—Sūrya siddhānta figures

A.D.	Kaliyuga.	Week-day of 1st January.	Commencement of Indian solar year. Day.	Fraction of day.	First new moon in solar year.	Anomaly of first new moon.
800	3901	6	20M	·9883	8·1606	11·371
801	3902	1	21M	·2471	26 7995	9·504
802	3903	2	21M	·5058	15·9078	5·661
803	3904	3	21M	·7646	5·0161	1·819
804	3905	5	21M	·0233	23·6550	27·507
805	3906	6	21M	·2821	12 7633	23·664
806	3907	7	21M	·5409	1·8716	19·821
807	3908	1	21M	·7996	20·5105	17·954
808	3909	3	21M	·0584	9·6188	14·112
809	3910	4	21M	·3171	28 2577	12·245
810	3911	5	21M	·5759	17·3660	8·402
811	3912	6	21M	·8346	6·4743	4·559
812	3913	1	21M	·0934	25·1131	2·693
813	3914	2	21M	·3522	14·2214	26·404
814	3915	3	21M	·6109	3·3297	22·562
815	3916	4	21M	·8697	21·9686	20·695
816	3917	6	21M	·1284	11·0769	16·852
817	3918	7	21M	·3872	0·1852	13·009
818	3919	1	21M	·6459	18·8241	11·143
819	3920	2	21M	·9047	7·9324	7·300
820	3921	4	21M	·1634	26·5713	5·433
821	3922	5	21M	·4222	15·6796	1·590
822	3923	6	21M	·6810	4·7879	25·302
823	3924	7	21M	·9397	23·4268	23·435
824	3925	2	21M	·1985	12·5351	19·593
825	3926	3	21M	·4572	1·6434	15·750
826	3927	4	21M	·7160	20·2823	13·883
827	3928	5	21M	·9747	9·3906	10·040
828	3929	7	21M	·2335	28·0295	8·174
829	3930	1	21M	·4923	17·1378	4·331
830	3931	2	21M	·7510	6·2461	0·488
831	3932	3	22M	·0098	24·8849	26·176
832	3933	5	21M	·2685	13·9932	22·333
833	3934	6	21M	·5273	8·1015	18·491
834	3935	7	21M	·7860	21·7404	16·624
835	3936	2	22M	0448	10·8487	12·781
836	3937	3	21M	·3036	29·4876	10·914
837	3938	4	21M	·5623	18·5959	7·072
838	3939	5	21M	·8211	7·7042	3·229
839	3940	7	22M	·0798	26·3431	1·362

A.D.	Kaliyuga.	Week-day of 1st January.	Commencement of Indian solar year. Day.	Fraction of day.	First new moon in solar year.	Anomaly of first new moon.
840	3941	1	21M	·3386	15·4514	25·074
841	3942	2	21M	·5973	4·5597	21·231
842	3943	3	21M	·8561	23·1986	19·364
843	3944	5	22M	·1149	12 3069	15·522
844	3945	6	21M	·3736	1·4152	11·679
845	3946	7	21M	·6324	20·0541	9 812
846	3947	1	21M	·8911	9·1624	5·969
847	3948	3	22M	·1499	27 8012	4·103
848	3949	4	21M	4086	16 9095	0·260
849	3950	5	21M	·6674	6 0178	23·972
850	3951	6	21M	·9262	24·6567	22·105
851	3952	1	22M	·1849	13·7650	18·262
852	3953	2	21M	·4437	2·8733	14·419
853	3954	3	21M	·7024	21·5122	12·552
854	3955	4	21M	·9612	10·6205	8·170
855	3956	6	22M	·2199	29·2594	6·843
856	3957	7	21M	·4787	18·3677	3·000
857	3958	1	21M	·7375	7·4760	26·712
858	3959	2	21M	·9962	26 1149	24·845
859	3960	4	22M	·2550	15 2232	21·003
860	3961	5	21M	·5137	4·3315	17·160
861	3962	6	21M	·7725	22·9704	15·293
862	3963	1	22M	·0812	12 0787	11·450
863	3964	2	22M	·2900	1·1870	7·608
864	3965	3	21M	5487	19·8259	5·741
865	3966	4	21M	·8075	8·9342	1·898
866	3967	6	22M	·0663	27·5730	0·031
867	3968	7	22M	·3250	16·6813	23·744
868	3969	1	21M	·5838	5·7896	19·901
869	3970	2	21M	·8425	24 4285	18·034
870	3971	4	22M	·1013	3·5368	14·191
871	3972	5	22M	3600	2·6451	10·348
872	3973	6	21M	·6188	21·2840	8·481
873	3974	7	21M	·8776	10 3923	4·639
874	3975	2	22M	·1363	29·0312	2·772
875	3976	3	22M	·3951	18·1895	26·484
876	3977	4	21M	·6538	7·2478	22·641
877	3978	5	21M	·9126	25·8867	20·774
878	3979	7	22M	·1713	14·9950	16·932
879	3980	1	22M	·4301	4·1038	13·089

A.D.	Kaliyuga.	Week-day of 1st January.	Commencement of Indian solar year. Day.	Fraction of day.
880	3981	2	21M	·6889
881	3982	3	21M	·9476
882	3983	5	22M	·2064
883	3984	6	22M	·4651
884	3985	7	21M	·7239
885	3986	1	21M	·9826
886	3987	3	22M	·2414
887	3988	4	22M	·5002
888	3989	5	21M	·7589
889	3990	6	22M	·0177
890	3991	1	22M	·2764
891	3992	2	22M	·5352
892	3993	3	21M	·7939
893	3994	5	22M	·0527
894	3995	6	22M	·3115
895	3996	7	22M	·5702
896	3997	1	21M	·8290
897	3998	3	22M	·0877
898	3999	4	22M	·3465
899	4000	5	22M	6052
900	4001	6	21M	·8640
901	4002	1	22M	·1228
902	4003	2	22M	·3815
903	4004	3	22M	·6403
904	4005	4	21M	·8990
905	4006	6	22M	·1578
906	4007	7	22M	·4165
907	4008	1	22M	·6753
908	4009	2	21M	·9341
909	4010	4	22M	·1928
910	4011	5	22M	·4516
911	4012	6	22M	·7103
912	4013	7	21M	·9691
913	4014	2	22M	·2278
914	4015	3	22M	·4866
915	4016	4	22M	·7453
916	4017	5	21M	·0041
917	4018	7	22M	·2629
918	4019	1	22M	·5216
919	4020	2	22M	·7804

for A.D. 500 to A.D. 999—*cont.*

First new moon in solar year.	Anomaly of first new moon.	A.D.	Kaliyuga.	Week-day of 1st January.	Commencement of Indian solar year. Day.	Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	A.D.	Kaliyuga.	Week-day of 1st January.	Commencement of Indian solar year. Day.	Fraction of day.	First new moon in solar year.	Anomaly of first new moon.
22·7422	11·222	**920**	4021	4	22M	·0391	0·5024	22·949	**960**	4061	5	22M	·3894	7·7981	9·098
11·8505	7·379	**921**	4022	5	22M	·2979	19·1412	21·083	**961**	4062	6	22M	·6482	26·4320	7·281
0·9588	3·537	**922**	4023	6	22M	5566	8·2495	17·240	**962**	4063	7	22M	·9069	15 5403	3·388
19·5977	1·670	**923**	4024	7	22M	·8154	26·8884	15·373	**963**	4064	2	23M	·1657	4 6486	27·100
8·7060	27·382	**924**	4025	2	22M	·0742	15·9967	11·530	**964**	4065	3	22M	·4244	23·2875	25·238
27·3448	23·515	**925**	4026	3	22M	·3329	5·1050	7·688	**965**	4066	4	22M	·6832	12·3958	21·391
16·4531	19·672	**926**	4027	4	22M	·5917	23·7439	5·828	**966**	4067	5	22M	·9419	1 5041	17·548
5·5614	15 829	**927**	4028	5	22M	·8504	12·8522	1·978	**967**	4068	7	23M	·2007	20·1430	15·681
24·2003	13 963	**928**	4029	7	22M	·1092	1 9605	25 690	**968**	4069	1	22M	·4595	9·2513	11·838
13 8086	10·120	**929**	4030	1	22M	·3679	20·5994	23·823	**969**	4070	2	22M	·7182	27·8902	9·972
2·4169	6 277	**930**	4031	2	22M	·6267	9·7077	19 980	**970**	4071	3	22M	9770	16·9985	6·129
21·0558	4 410	**931**	4032	3	22M	·8855	28·3466	18·114	**971**	4072	5	23M	·2357	6·1068	2·286
10 1641	0·568	**932**	4032	5	22M	·1442	17·4549	14·271	**972**	4073	6	22M	·4945	24·7457	0·419
28·8030	26·256	**933**	4034	6	22M	·4020	6·5632	10·428	**973**	4074	7	22M	·7532	13·8540	24·131
17·9113	22·413	**934**	4035	7	22M	·6617	25·2021	8·561	**974**	4075	1	23M	·0120	2·9623	20·288
7·0196	18·570	**935**	4036	1	22M	·9205	14·3104	4·719	**975**	4076	3	23M	·2708	21·6011	18·422
25·6585	16·703	**936**	4037	3	22M	1792	3·4187	0 876	**976**	4077	4	22M	·6295	10·7094	14·579
14·7668	12 861	**937**	4038	4	22M	·4380	22·0575	26·564	**977**	4078	5	22M	·7883	29·3483	12·712
3·8751	9·018	**938**	4039	5	22M	·6968	11·1658	22 721	**978**	4079	7	23M	·0470	18·4566	8·869
22·5140	7·151	**939**	4040	6	22M	·9555	0·2741	18 878	**979**	4080	1	23M	·3058	7·5649	5·030
11 6220	3·309	**940**	4041	1	22M	·2148	18·9130	17·011	**980**	4081	2	22M	·5645	26·2038	3·160
0·7306	27 021	**941**	4042	2	22M	·4730	8·0213	13·169	**981**	4082	3	22M	·8233	15·3121	26·872
19·3694	25·154	**942**	4043	3	22M	·7318	26·6602	13 299	**982**	4083	5	23M	·0821	4·4204	23·029
8·4777	21·311	**943**	4044	4	22M	·9904	15·7685	7·459	**983**	4084	6	23M	3408	23·0593	21·162
27·1166	19·444	**944**	4045	5	22M	·2493	4·8768	3·617	**984**	4085	7	22M	·5996	12·1676	17·319
16·2249	15 602	**945**	4046	7	22M	·5081	23·5157	1·750	**985**	4086	1	22M	·8583	1·2759	13·477
5·3332	11·752	**946**	4047	1	22M	·7668	12 6240	25·463	**986**	4087	3	23M	·1171	19·9148	11·610
23·9721	9·892	**947**	4048	2	22M	·0256	1·7323	21·612	**987**	4088	4	23M	·3578	9·0231	7 767
13·0804	6 049	**948**	4049	4	22M	·2843	20·8712	19·752	**988**	4089	5	22M	·6346	27·6620	5·900
2·1887	2·207	**949**	4050	5	22M	·5431	9·4795	15·909	**989**	4090	6	22M	·8994	16·7703	2·058
20 8276	0·840	**950**	4051	6	22M	·8018	28·1184	14·043	**990**	4091	1	23M	·1521	5·8786	25·769
9·9359	24·052	**951**	4052	1	23M	·0606	17·2267	10 200	**991**	4092	2	23M	·4109	24 5174	23·903
28·5748	22·185	**952**	4053	2	22M	·3194	6·8350	6·357	**992**	4093	3	22M	·6696	13·6257	20·060
17·6831	18·342	**953**	4054	3	22M	·5781	24·9739	4·490	**993**	4094	4	22M	·9284	2·7340	16·217
6·7914	14·499	**954**	4055	4	22M	·8369	14·0822	0·648	**994**	4095	6	23M	·1871	21·3729	14·350
25·4303	12·633	**955**	4056	6	23M	·0956	3·1905	24·359	**995**	4096	7	23M	·4459	10·4812	10·508
14·5386	8·790	**956**	4057	7	22M	·3544	21·8293	22·493	**996**	4097	1	22M	·7047	29·1201	8·641
3·6469	4·947	**957**	4058	1	22M	·6131	10·9376	18·650	**997**	4098	2	22M	·9734	18·2284	4·798
22·2858	3·080	**958**	4059	2	22M	·8719	0 0459	14·807	**998**	4099	4	23M	·2222	7 3367	0·955
11·3941	26·792	**959**	4060	4	23M	·1306	18·6848	12·940	**999**	4100	5	23M	·4809	25·9756	26·643

TABLE II.—

			Commencement of solar year.					Vaiśākha.				Jyeshṭha.				Āshāḍha.				Śrâvaṇa.				Bhādrapada.			
Kaliyuga.	Vikrama era.	Śaka era.	Month and day A.D.	Fraction of day.	First new moon in solar year	Anomaly of first new moon.	A.D.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
4101	1057	922	22M	·7396	15·0839	22·801	**1000**	7	Ap	6●	·82	2	My	6	·35	3	Je	4	·88	5	Jl	4	·41	6	Au	2	·95
4102	1058	923	22M	·9983	4·1922	18·959	**1001**	5	Mr	27	·19	6	Ap	25	·72	1 2	My Je	25 23	·25 ·78	4	Jl	23	·31	5	Au	21○	·84
4103	1059	924	23M	·2571	22·8811	17·091	**1002**	4	Ap	15	·09	5	My	14	·82	7	Je	13	·15	1	Jl	12	·68	3	Au	11●○	·21
4104	1060	925	23M	·5158	11·9394	13·249	**1003**	1	Ap	4	·45	2	My	3	·99	4	Je	2	·52	6	Jl	2	·05	7	Jl	31○	·58
4105	1061	926	22M	·7746	1·0477	9·406	**1004**	5 7	Mr Ap	23 22	·82 ·35	1	My	21	·88	3	Je	20○	·41	4	Jl	19●	·94	6	Au	18	·47
4106	1062	927	23M	·0334	19·6866	7·539	**1005**	4	Ap	11	·72	6	My	11	·25	7	Je	9○	·78	2	Jl	9	·31	3	Au	7	·84
4107	1063	928	23M	·2921	8·7949	3·696	**1006**	2	Ap	1	·09	3	Ap	30	·62	5	My	30○	·15	6	Je	28	·68	1 2	Jl Au	28 26	·21 ·74
4108	1064	929	23M	·5509	27·4338	1·830	**1007**	7	Ap	19	·98	2	My	19●	·51	4	Je	18	·05	5	Jl	17	·58	7	Au	16	·11
4109	1065	930	22M	·8096	16·5421	25·542	**1008**	5	Ap	8○	·35	6	My	7	·88	1	Je	6	·41	2	Jl	5	·94	4	Au	4	·47
4110	1066	931	23M	·0684	5·6504	21·699	**1009**	2	Mr	28○	·72	4	Ap	27	·25	5	My	26	·78	7 1	Je Jl	25 24	·31 ·84	3	Au	23	·37
4111	1067	932	23M	·3271	24·2892	19·832	**1010**	1	Ap	16	·62	3	My	16	·15	4	Je	14	·68	6	Jl	14	·21	7	Au	12	·74
4112	1068	933	23M	·5859	13·3975	15·989	**1011**	5	Ap	5	·98	7	My	5	·51	2	Je	4	·04	3	Jl	3	·57	5	Au	2	·11
4113	1069	934	22M	·8446	2·5058	12·147	**1012**	3	Mr	25	·35	4 6	Ap My	23 23	·88 ·41	7	Je	21	·94	2	Jl	21○	·47	4	Au	20●	·00
4114	1070	935	23M	·1034	21·1447	10·280	**1013**	2	Ap	13	·25	3	My	12	·78	5	Je	11	·31	6	Jl	10○	·84	1	Au	9	·37
4115	1071	936	23M	·3622	10·2530	6·437	**1014**	6	Ap	2	·61	1	My	2	·15	2	My	31	·68	4	Je	30●○	·21	5	Jl	29	·74
4116	1072	937	23M	·6209	28·8919	4·570	**1015**	5	Ap	21	·51	7	My	21○	·04	1	Je	19●	·57	3	Jl	19	·10	4	Au	17	·63
4117	1073	938	22M	·8797	18·0002	0·727	**1016**	2	Ap	9	·88	4	My	9○	·41	5	Je	7	·94	7	Jl	7	·47	2	Au	6	·00
4118	1074	939	23M	·1384	7·1085	24·439	**1017**	7	Mr	30	·25	1	Ap	28○	·78	3	My	28	·31	4 6	Je Jl	26 26	·84 ·37	7	Au	24	·90
4119	1075	940	23M	·3972	25·7474	22·573	**1018**	6	Ap	18	·14	7	My	17	·67	2	Je	16	·21	3	Jl	15	·74	5	Au	14	·27
4120	1076	941	23M	·6559	14·8557	18·730	**1019**	3	Ap	7●	·51	5	My	7	·04	6	Je	5	·57	1	Jl	5	·10	2	Au	3	·63
4121	1077	942	22M	·9147	3·9640	14·887	**1020**	7	Mr	26	·88	2	Ap	25	·41	3 5	My Je	24 23	·94 ·47	7	Jl	23	·00	1	Au	21○	·53
4122	1078	943	23M	·1735	22·6029	13·020	**1021**	6	Ap	14	·78	1	My	14	·31	2	Je	12	·84	4	Jl	12	·37	5	Au	10●○	·90
4123	1079	944	23M	·4322	11·7112	9·178	**1022**	4	Ap	4	·14	5	My	3	·67	7	Je	2	·20	1	Jl	1○	·73	3	Jl	31	·27
4124	1080	945	23M	·6910	0·8195	5·334	**1023**	1 3	Mr Ap	24 23	·51 ·04	4	My	22	·57	6	Je	21○	·10	7	Jl	20	·63	2	Au	19	·16
4125	1081	946	22M	·9497	19·4584	3·468	**1024**	7	Ap	11	·41	1	My	10	·94	3	Je	9●○	·47	5	Jl	9	·00	6	Au	7	·53
4126	1082	947	23M	·2085	8·5667	27·180	**1025**	4	Mr	31	·77	6	Ap	30	·31	7	My	29	·84	2	Je	28	·37	3 5	Jl Au	27 26	·90 ·43
4127	1083	948	23M	·4672	27·2056	25·313	**1026**	3	Ap	19○	·67	5	My	19●	·20	6	Je	17	·73	1	Jl	17	·26	2	Au	15	·79
4128	1084	949	23M	·7260	16·3139	21·470	**1027**	1	Ap	9○	·04	2	My	8	·57	4	Je	7	·10	5	Jl	6	·63	7	Au	5	·16
4129	1085	950	22M	·9848	5·4222	17·628	**1028**	5	Mr	28○	·41	6	Ap	26	·94	1	My	26	·47	3 4	Je Jl	25 24	·00 ·53	6	Au	23	·06
4130	1086	951	23M	·2435	24·0610	15.761	**1029**	4	Ap	16	·30	5	My	15	·83	7	Je	14	·37	1	Jl	13	·90	3	Au	12	·43
4131	1087	952	23M	·5023	13·1693	11·918	**1030**	1	Ap	5	·67	3	My	5	·20	4	Je	3	·73	6	Jl	3	·26	7	Au	1○	·79
4132	1088	953	23M	·7610	2·2776	8·075	**1031**	6	Mr	26	·04	7 2	Ap My	24 24	·57 ·10	3	Je	22	·63	5	Jl	22○	·16	6	Au	20	·69
4133	1089	954	23M	·0198	20·9165	6·209	**1032**	4	Ap	12	·94	6	My	12	·47	1	Je	11	·00	2	Jl	10●○	·53	4	Au	9	·06
4134	1090	955	23M	·2785	10·0218	2·366	**1033**	2	Ap	2	·30	3	My	1	·83	5	My	31○	·36	6	Je	29●	·89	1	Jl	29	·43
4135	1091	956	23M	·5373	28·6687	0·499	**1034**	1	Ap	21	·20	2	My	20○	·73	4	Je	19●	·26	5	Jl	18	·79	7	Au	17	·32
4136	1092	957	23M	·7960	17·7720	24·211	**1035**	5	Ap	10	·57	7	My	10●○	·10	1	Je	8	·63	3	Jl	8	·16	4	Au	6	·69
4137	1093	958	23M	·0548	6·8803	20·368	**1036**	2	Mr	29	·93	4	Ap	28●	·47	6	My	28	·00	7 2	Je Jl	26 26	·53 ·06	3	Au	24	·59
4138	1094	959	23M	·3136	25·5192	18·501	**1037**	1	Ap	17	·83	3	My	17	·36	4	Je	15	·89	6	Jl	15	·42	7	Au	13	·95
4139	1095	960	23M	·5723	14·6275	14·659	**1038**	6	Ap	7	·20	7	My	6	·73	2	Je	5	·26	3	Jl	4	·79	5	Au	3	·32
4140	1096	961	23M	·8311	3·7358	10·816	**1039**	3	Mr	27	·57	5	Ap	26	·10	6 1	My Je	25 24	·63 ·16	2	Jl	23	·69	4	Au	22●○	·22
4141	1097	962	23M	·0898	22·3747	8·949	**1040**	2	Ap	14	·46	3	My	13	·99	5	Je	12	·53	7	Jl	12	·06	1	Au	10	·59
4142	1098	963	23M	·3486	11·4830	5·106	**1041**	6	Ap	3	·83	1	My	3	·36	2	Je	1	·89	4	Jl	1○	·42	5	Jl	30	·95
4143	1099	964	23M	·6073	0·5913	1·264	**1042**	4 5	Mr Ap	24 22	·20 ·73	7	My	22	·26	1	Je	20●○	·79	3	Jl	20	·32	4	Au	18	·85
4144	1100	965	23M	·8661	19·2302	26·952	**1043**	3	Ap	12	·10	4	My	11	·63	6	Je	10●	·16	7	Jl	9	·69	2	Au	8	·22
4145	1101	966	23M	·1249	8·3385	23·109	**1044**	7	Mr	31	·46	1	Ap	29○	·99	3	My	29	·52	5	Je	28	·05	6 1	Jl Au	27 26	·59 ·12
4146	1102	967	23M	·3836	26·9773	21·242	**1045**	6	Ap	19●○	·36	7	My	18	·89	2	Je	17	·42	3	Jl	16	·95	5	Au	15	·48
4147	1103	968	23M	·6424	16·0856	17·399	**1046**	3	Ap	8●○	·73	5	My	8	·26	6	Je	6	·79	1	Jl	6	·32	2	Au	4	·85
4148	1104	969	23M	·9011	5·1939	13·557	**1047**	1	Mr	29●	·09	2	Ap	27	·63	4	My	27	·16	5 7	Je Jl	25 25	·69 ·22	1	Au	23	·75
4149	1105	970	23M	·1599	23·8328	11·690	**1048**	6	Ap	15	·99	1	My	15	·52	3	Je	14	·05	4	Jl	13	·58	6	Au	12○	·11
4150	1106	971	23M	·4186	12·9411	7·847	**1049**	4	Ap	5	·36	5	My	4	·89	7	Je	3	·42	1	Jl	2	·95	3	Au	1○	·4
4151	1107	972	23M	·6774	2·0494	4·004	**1050**	1	Mr	25	·73	3 4	Ap My	24 23	·26 ·79	6	Je	22	·32	7	Jl	21○	·85	2	Au	20	·3
4152	1108	973	23M	·9362	20·6883	2·138	**1051**	7	Ap	13	·62	2	My	13	·15	3	Je	11○	·69	5	Jl	11	·22	6	Au	9	·7
4153	1109	974	23M	·1949	9·7966	25·849	**1052**	4	Ap	1	·99	6	My	1	·52	1	My	31○	·05	2	Je	29	·58	4	Jl	29	·1

N.B.—For tithis by other siddhāntas, add algebraically t

Sūrya siddhānta.

Āśvina				Kārttika				Mārgaśīrsha				Pausha				A.D.	Māgha				A.D.	Phālguna				Chaitra			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
1	S	1	·48	3	O	1●	·01	4	O	30	·54	6	N	29	·07		7	D	28	·60	01	2	Jr	27	·13	3	F	25○	·66
7	S	20●	·37	1	O	19	·90	3	N	18	·43	4	D	17	·97	02	6	Jr	16	·50		1	F	15○	·03	2	Mr	16	·56
4	S	9	·74	6	O	9	·27	7	N	7	·80	2	D	7	·33	03	3	Jr	5	·86		5	F	4○	·39	6	Mr	5	·92
2	Au	30	·11	3	S	28	·64	5	O	28	·17	6	N	26	·70		1	D	26	·23	04	2	Jr	24	·76	4	F	23	·29
1	S	17	·01	2	O	16	·54	4	N	15	·07	5	D	14○	·60	05	7	Jr	13●	·13		1	F	11	·66	3	Mr	13	·19
5	S	6	·37	6	O	5	·90	1	N	4	·43	2	D	3○	·96	06	4	Jr	2	·49		6	F	1	·03	7	Mr	2	·56
4	S	25	·27	5	O	24	·80	7	N	23○	·33	1	D	22	·86	07	3	Jr	21	·39		4	F	19	·92	6	Mr	21	·45
1	S	14	·64	3	O	14	·17	4	N	12	·70	6	D	12	·23	08	7	Jr	10	·76		2	F	9	·29	3	Mr	9	·82
6	S	3	·00	7	O	2○	·53	2	N	1	·07	3	N	30	·60		5	D	30	·13	09	6	Jr	28	·66	1	F	27	·19
4	S	21○	·90	6	O	21	·43	7	N	19	·96	2	D	19	·49	10	4	Jr	18	·02		5	F	16	·55	7	Mr	18○	·09
2	S	11○	·27	3	O	10	·80	5	N	9	·33	6	D	8	·86	11	1	Jr	7	·39		2	F	5	·92	4	Mr	7	·45
6	Au	31	·64	1	S	30	·17	2	O	29	·70	4	N	28	·23		5	D	27	·76	12	7	Jr	26○	·29	1	F	24	·82
5	S	18	·53	7	O	18	·06	1	N	16	·59	3	D	16	·13	13	4	Jr	14○	·66		6	F	13	·19	7	Mr	14	·72
2	S	7	·90	4	O	7	·43	5	N	5	·96	7	D	5	·49	14	2	Jr	4●	·02		3	F	2	55	5	Mr	4	·08
7	Au	28	·27	1	S	26	·80	3	O	26	33	4	N	24	·86		6	D	24	·39	15	7	Jr	22	·92	2 3	F Mr	21 22	·45 ·98
6	S	16	·17	7	O	15	·70	2	N	14○	·23	3	D	13	·76	16	5	Jr	12	·29		6	F	10	·82	1	Mr	11	·35
3	S	4	·53	5	O	4	·06	6	N	2○	·59	1	D	2	·12		2	D	31	·65	17	4	Jr	30	·19	5	F	28	·72
2	S	23	·43	3	O	22○	·96	5	N	21	·49	7	D	21	·02	18	1	Jr	19	·55		3	F	18	·08	4	Mr	19	·61
6	S	12	·83	1	O	12	·33	2	N	10	·86	4	D	10	·39	19	5	Jr	8	·92		7	F	7	·45	1	Mr	8○	·98
4	S	2○	·16	5	O	1	·69	7	O	31	·23	1	N	29	·76		3	D	29	·29	20	4	Jr	27	·82	6	F	26○	·35
3	S	20	·06	4	O	19	·59	6	N	18	·12	7	D	17	·65	21	2	Jr	16	·18		3	F	14○	·71	5	Mr	16	·25
7	S	9	·43	1	O	8	·96	3	N	7	49	5	D	7	·02	22	6	Jr	5	·55		1	F	4	·08	2	Mr	5	·61
4	Au	29	·80	6	S	28	·33	7	O	27	·86	2	N	26	·39		3	D	25○	·92	23	5	Jr	24	45	6	F	22	·98
3	S	17	·69	5	O	17	·22	6	N	15	·75	1	D	15○	·29	24	2	Jr	13	·82		4	F	12	·35	5	Mr	12	·88
1	S	6	·06	2	O	5	·59	4	N	4	12	5	D	3●○	·65	25	7	Jr	2	·18		1	Jr	31	·71	3	Mr	2	24
6	S	24	·96	1	O	24	·49	3	N	23●	·02	4	D	22	·55	26	6	Jr	21	·08		7	F	19	·61	2	Mr	21	·14
4	S	14	·33	5	O	13○	·86	7	N	12●	·39	1	D	11	·92	27	3	Jr	10	·45		4	F	8	·98	6	Mr	10	·51
1	S	3	·69	3	O	3○	·22	4	N	1●	·75	6	D	1	·28		7	D	30	·81	28	2	Jr	29	·35	3	F	27	·88
7	S	21●○	·59	2	O	21	·12	3	N	19	·65	5	D	19	·18	29	6	Jr	17	·71		1	F	16	·24	2	Mr	17	·77
4	S	10●	·96	6	O	10	·49	1	N	9	·02	2	D	8	·55	30	4	Jr	7	·08		5	F	5○	·61	7	Mr	7	·14
2	Au	31	·32	3	S	29	·85	5	O	29	·39	6	N	27	·92		1	D	27	·45	31	2	Jr	25○	·98	4	F	24	·51
1	S	19	·22	2	O	18	·75	4	N	17	·28	5	D	16	·81	32	7	Jr	15●	·34		1	F	13	·87	3	Mr	14	·41
5	S	7	·59	7	O	7	·12	1	N	5	·65	3	D	5	·18	33	4	Jr	3●	·71		6	F	2	24	7	Mr	3	·77
2	Au	27	·96	4	S	26	·49	6	O	26	·02	7	N	24○	·55		2	D	24	·08	34	3	Jr	22	·61	5 6	F Mr	21 22	·14 ·67
1	S	15	·85	3	O	15	·38	4	N	13○	·91	6	D	13	·45	35	7	Jr	11	·98		2	F	10	·51	4	Mr	12	·04
6	S	5	·22	7	O	4	·75	2	N	3○	·28	3	D	2	·81	36	5	Jr	1	·34		6	Jr	30	·87	1	F	29	·40
5	S	23	·12	6	O	22●	·65	1	N	21	·18	2	D	20	·71	37	4	Jr	19	·24		5	F	17	·77	7	Mr	19○	·30
2	S	12○	·49	4	O	12	·02	5	N	10	·55	7	D	10	·08	38	1	Jr	8	·61		3	F	7	·14	4	Mr	8○	·67
6	S	1○	·85	1	O	1	·38	2	O	30	·91	4	N	29	·44		5	D	28	·97	39	7	Jr	27	·51	2	F	26○	·04
5	S	20	·75	7	O	20	·28	1	N	18	·81	3	D	18	·34	40	4	Jr	16	·87		6	F	15●	·40	7	Mr	15	·93
3	S	9	·12	4	O	8	·65	6	N	7	·18	7	D	6	·71	41	2	Jr	5○	·24		3	F	3	·77	5	Mr	5	·30
7	Au	29	·46	2	S	28	·01	3	O	27	·55	5	N	26	·08		6	D	25○	·61	42	1	Jr	24	14	2	F	22	·67
6	S	17	·38	7	O	16	·91	2	N	15	·44	3	D	14●○	·97	43	5	Jr	13	·50		7	F	12	·03	1	Mr	13	·57
3	S	6	·75	5	O	6	·28	6	N	4	·81	1	D	4●	·34	44	2	Jr	2	·87		4	F	1	·40	5	Mr	21	·93
2	S	24	·65	4	O	24○	·18	5	N	22●	·71	7	D	22	·24	45	1	Jr	20	·77		3	F	19	·30	4	Mr	20	·83
7	S	14	·01	1	O	13○	·54	3	N	12	·07	4	D	11	·61	46	6	Jr	10	·14		7	F	8	·67	2	Mr	10	·20
4	S	3	·38	5	O	2○	·91	7	N	1	·44	1	N	30	·97		3	D	30	·50	47	5	Jr	29	·03	6	F	27	·56
3	S	22●	·28	4	O	21	·81	6	N	20	·34	7	D	19	·87	48	2	Jr	18	·40		3	F	16○	·93	5	Mr	17●	·46
7	S	10	·65	2	O	10	·18	3	N	8	·71	5	D	8	·24	49	6	Jr	6	·77		1	F	5●○	·30	2	Mr	6	·83
5	Au	31	·01	6	S	29	·54	1	O	29	·07	2	N	27	·60		4	D	27	·13	50	5	Jr	25	·67	7	F	24	·20
3	S	18	·91	5	O	18	·44	6	N	16	·97	1	D	16	·50	51	3	Jr	15●	·03		4	F	13	56	6	Mr	15	·09
1	S	8	·28	2	O	7	·81	4	N	6	·34	5	D	5○	·87	52	7	Jr	4	·40		1	F	2	·93	3	Mr	3	·46
5 7	Au S	27 26	·64 ·17	1	O	25	·71	3	N	24●○	·24	Pausha Kshaya					4	D	23	·77	53	6	Jr	22	·80	7 2	F Mr	20 22	·83 ·36

the above + ·01 for Ārya siddhānta and — ·05 for Brahma siddhānta.

TABLE II.—

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new-moon.	Christian era. A.D	Vaiśākha. Week-day.	Month.	Day.	Fraction.	Jyeshṭha. Week-day.	Month.	Day.	Fraction.	Āshāḍha. Week-day.	Month.	Day.	Fraction.	Śrāvaṇa. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day.	Month.	Day.	Fraction.
4154	1110	975	23M	·4587	28·4355	23·983	**1053**	3	Ap	20	·89	5	My	20○	·42	6	Je	18	·95	1	Jl	18	·48	3	Au	17	·01
4155	1111	976	23M	.7124	17·5438	20·140	**1054**	1	Ap	10	·26	2	My	9●	·79	4	Je	8	·32	5	Jl	7	·85	7	Au	6	·38
4156	1112	977	23M	·9711	6·6521	16·297	**1055**	5	Mr	30○	·62	7	Ap	29	·15	1	My	28	·68	3 4	Je Jl	27 26	·21 ·75	6	Au	25	·28
4157	1113	978	23M	·2299	25·2910	14·430	**1056**	4	Ap	17	·52	6	My	17	05	7	Je	15	·58	2	Jl	15	·11	3	Au	13	·64
4158	1114	979	23M	·4887	14·3998	10·588	**1057**	1	Ap	6	·89	3	My	6	·42	4	Je	4	95	6	Jl	4	·48	1	Au	3	·01
4159	1115	980	23M	·7474	3·5076	6·745	**1058**	6	Mr	27	·25	7 2	Ap My	25 25	·79 32	3	Je	23	·85	5	Jl	23	·38	6	Au	21●	·91
4160	1116	981	24M	0062	22·1465	4·878	**1059**	5	Ap	15	·15	6	My	14	·68	1	Je	13	·21	2	Jl	12○	·74	4	Au	11●	·27
4161	1117	982	23M	·2650	11·2548	1·035	**1060**	2	Ap	3	·52	4	My	3	·05	5	Je	1	·58	7	Jl	1○	·11	1	Jl	30	·64
4162	1118	983	23M	·5237	0·3631	24·747	**1061**	6 1	Mr Ap	23 22	·89 ·42	2	My	21	·95	4	Je	20●	48	6	Jl	20	·01	7	Au	18	·54
4163	1119	984	23M	·7825	19·0020	22·880	**1062**	5	Ap	11	·78	7	My	11○	·31	1	Je	9	·85	3	Jl	9	·38	4	Au	7	·91
4164	1120	985	24M	·0412	8·1103	19·038	**1063**	3	Ap	1	·15	4	Ap	30○	·68	6	My	30	·21	7	Je	28	·74	2 3	Jl Au	28 26	·27 ·80
4165	1121	986	23M	·3000	26·7491	17·171	**1064**	2	Ap	19●○	·05	3	My	18	·58	5	Je	17	·11	6	Jl	16	64	1	Au	15	·17
4166	1122	987	23M	·5587	15·8574	18·328	**1065**	6	Ap	8	·42	7	My	7	·95	2	Je	6	·48	4	Jl	6	·01	5	Au	4	·54
4167	1123	988	23M	·8175	4·9657	9·485	**1066**	3	Mr	28	·78	5	Ap	27	·81	6 1	My Je	26 25	84 ·37	2	Jl	24	·91	4	Au	23○	·44
4168	1124	989	24M	·0763	23·6046	7·619	**1067**	2	Ap	16	·68	4	My	16	·21	5	Je	14	·74	7	Jl	14	·27	1	Au	12○	·80
4169	1125	990	23M	·3350	12·7129	3·776	**1068**	7	Ap	5	·05	1	My	4	·58	3	Je	3	·11	4	Jl	2	·64	6	Au	1○	·17
4170	1126	991	23M	·5938	1·8212	27·488	**1069**	4	Mr	25	·41	5 7	Ap My	23 23	·95 ·48	2	Je	22	·01	3	Jl	21●	·54	5	Au	20	·07
4171	1127	992	23M	·8525	20·4601	25·621	**1070**	3	Ap	13	·31	4	My	12	·84	6	Je	11○	·37	7	Jl	10●	·90	2	Au	9	·43
4172	1128	993	24M	·1113	9·5684	21·778	**1071**	7	Ap	2	·68	2	My	2	·21	3	My	31○	·74	5	Je	30	·27	6	Jl	29	·80
4173	1129	994	23M	·3700	28·2073	19·912	**1072**	6	Ap	20	·58	1	My	20	·11	2	Je	18	·64	4	Jl	18	·17	5	Au	16	·70
4174	1130	995	23M	·6288	17·3156	16·069	**1073**	3	Ap	9○	·94	5	My	9●	·47	7	Je	8	·00	1	Jl	7	54	3	Au	6	·07
4175	1131	996	23M	·8876	6·4239	12·226	**1074**	1	Mr	30○	·31	2	Ap	28●	·84	4	My	28	37	5 7	Je Jl	26 26	·90 ·43	1	Au	24	·96
4176	1132	997	24M	·1463	25·0628	10·359	**1075**	7	Ap	18	·21	1	My	17	·74	3	Je	16	·27	4	Jl	15	·80	6	Au	14	·33
4177	1133	998	23M	·4051	14·1711	6·517	**1076**	4	Ap	6	·58	6	My	6	·11	7	Je	4	·64	2	Jl	4	·17	3	Au	2	·70
4178	1134	999	23M	·6638	3·2794	2·674	**1077**	1	Mr	26	·94	3 5	Ap My	25 25	·47 ·00	6	Je	23	·53	1	Jl	23○	·06	2	Au	21	·60
4179	1135	1000	23M	·9226	21·9183	0·807	**1078**	7	Ap	14	·84	2	My	14	·37	3	Je	12	·90	5	Jl	12○	·43	6	Au	10	·96
4180	1136	1001	24M	·1813	11·0266	24·519	**1079**	5	Ap	4	·21	6	My	3	·74	1	Je	2	·27	2	Jl	1●	·80	4	Jl	31	·33
4181	1137	1002	23M	·4401	0·1349	20·676	**1080**	2 4	Mr Ap	23 22	·57 ·10	5	My	21○	·64	7	Je	20●	·17	1	Jl	19	·70	3	Au	18	·23
4182	1138	1003	23M	·6988	18·7738	18·809	**1081**	1	Ap	11	·47	3	My	11○	·00	4	Je	9	·53	6	Jl	9	·06	7	Au	7	·59
4183	1139	1004	23M	·9576	7·8820	14·967	**1082**	5	Mr	31	·84	7	Ap	30○	·37	1	My	29	·90	3	Je	28	·43	4 6	Jl Au	27 26	·96 ·49
4184	1140	1005	24M	·2164	29·5209	13·100	**1083**	4	Ap	19	·74	6	My	19	·27	7	Je	17	·80	2	Jl	17	·33	3	Au	15	·86
4185	1141	1006	23M	·4751	15·6292	9·257	**1084**	2	Ap	8	·10	3	My	7	·63	5	Je	6	·16	6	Jl	5	·70	1	Au	4	·23
4186	1142	1007	23M	·7839	4·7375	5·414	**1085**	6	Mr	28	·47	1	Ap	27	·00	2 4	My Je	26 25	·53 ·06	5	Jl	24	·59	7	Au	23○	·12
4187	1143	1008	23M	·9926	23·3764	3·548	**1086**	5	Ap	16	·37	6	My	15	·90	1	Je	14	·43	2	Jl	13	·96	4	Au	12●○	49
4188	1144	1009	24M	·2514	12·4847	27·259	**1087**	2	Ap	5	·74	4	My	5	·27	5	Je	3	·80	7	Jl	3	·33	1	Au	1●	·86
4189	1145	1010	23M	·5101	1·5930	23·417	**1088**	7	Mr	25	·10	1 3	Ap My	23 23	·63 ·16	4	Je	21○	·69	6	Jl	21	·22	7	Au	19	·76
4190	1146	1011	23M	·7689	20·2319	21·550	**1089**	6	Ap	13	·00	7	My	12	·53	2	Je	11●○	06	3	Jl	10	·59	5	Au	9	·12
4191	1147	1012	24M	·0277	9·3402	17·707	**1090**	3	Ap	2	·37	4	My	1	·90	6	My	31	·43	7	Je	29	·96	2	Jl	29	·49
4192	1148	1013	24M	·2864	27·9791	15·840	**1091**	2	Ap	21○	·26	3	My	20●	·80	5	Je	19	·33	6	Jl	18	·86	1	Au	17	·39
4193	1149	1014	23M	·5452	17·0874	11·998	**1092**	6	Ap	9○	·63	1	My	9	·16	2	Je	7	·69	4	Jl	7	·22	5	Au	5	·75
4194	1150	1015	23M	·8039	6·1957	8·155	**1093**	4	Mr	30○	·08	5	Ap	28	·53	7	My	28	·06	1 3	Je Jl	26 26	·59 ·12	4	Au	24	·65
4195	1151	1016	24M	·0627	24·8346	6·288	**1094**	2	Ap	17	·90	4	My	17	·43	5	Je	15	·96	7	Jl	15	·49	2	Au	14	·02
4196	1152	1017	24M	·3214	13·9429	2·445	**1095**	7	Ap	7	·26	1	My	6	·79	3	Je	5	·32	4	Jl	4	·86	6	Au	3○	·39
4197	1153	1018	23M	·5802	3·0512	26·157	**1096**	4	Mr	26	·63	6 7	Ap My	25 24	·16 ·69	2	Je	23	·22	3	Jl	22○	·75	5	Au	21	·28
4198	1154	1019	23M	·8390	21·6901	24·291	**1097**	3	Ap	14	·53	5	My	14	·06	6	Je	12	·59	1	Jl	12	·12	2	Au	10	·65
4199	1155	1020	24M	·0977	10·7984	20·448	**1098**	7	Ap	3	·90	2	My	3	·43	3	Je	1	·96	5	Jl	1	·49	7	Jl	31	·02
4200	1156	1021	24M	·3565	29·4872	18·581	**1099**	5 6	Mr Ap	24 22	·26 ·79	1	My	22○	·32	2	Je	20	·85	4	Jl	20	·38	5	Au	18	·92
4201	1157	1022	23M	·6152	18·5456	14·739	**1100**	4	Ap	11	·16	5	My	10●○	69	7	Je	9	·22	1	Jl	8	·75	3	Au	7	·28
4202	1158	1023	23M	·8740	7·6538	10·896	**1101**	1	Mr	31	·53	3	Ap	30●	·06	4	My	29	·59	6	Je	28	·12	7 2	Jl Au	27 26	·65 ·18
4203	1159	1024	24M	·1327	26·2927	9·029	**1102**	7	Ap	19●	·42	1	My	18	·96	3	Je	17	·49	5	Jl	17	·02	6	Au	15	·55
4204	1160	1025	24M	·3915	15·4010	5·186	**1103**	4	Ap	8	·79	6	My	8	·32	7	Je	6	·85	2	Jl	6	·38	3	Au	4	·91
4205	1161	1026	23M	·6502	4·5093	1·844	**1104**	2	Mr	28	·16	3	Ap	26	·69	5 6	My Je	26 24	·26 ·75	1	Jl	24	·28	2	Au	22○	·81
4206	1162	1027	23M	·9090	23·1482	27·031	**1105**	1	Ap	16	·06	2	My	15	·59	4	Je	14	·12	5	Jl	13	·65	7	Au	12	·18
4207	1163	1028	24M	·1678	12·2565	23·189	**1106**	5	Ap	5	·42	6	My	4	·95	1	Je	3	·48	3	Jl	3○	·02	4	Au	1●	·55
4208	1164	1029	24M	·4265	1·3648	19·846	**1107**	2	Mr	25	·79	4 5	Ap My	24 23	·32 ·85	7	Je	22○	·38	1	Jl	21	·91	3	Au	20	·44

N.B.—For tithis by other siddhāntas add algebraically to

Sūrya siddhānta—*cont.*

Āśvina.				Kārttika.				Mārgaśīrsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
4	S	15	·54	6	O	15	·07	7	N	18●○	·60	2	D	13	·18	**54**	3	Jr	11	·66		5	F	10	·19	6	Mr	11	·73
1	S	4	·91	3	O	4	·44	4	N	2●	·97	6	D	2	·50	**55**	1	Jr	1	03		2	Jr	30	·56	4	Mr	1	·09
7	S	23○	·81	2	O	23●	·84	3	N	21	·87	5	D	21	·40	**56**	6	Jr	19	·93		1	F	18	46	2	Mr	18○	·99
5	S	12●○	·17	6	O	11	·70	1	N	10	23	2	D	9	·77	**57**	4	Jr	8	·80		5	F	6	·83	7	Mr	8○	·86
2	S	1○	·54	4	O	1	·07	5	O	30	·60	7	N	29	·13		1	D	28	·66	**58**	3	Jr	27	·19	4	F	25	·72
1	S	20	·44	2	O	19	·97	4	N	18	·50	6	D	18	·03	**59**	7	Jr	16○	·56		2	F	15●	·09	3	Mr	16	·62
5	S	9	·81	7	O	9	·34	1	N	7	·87	3	D	7	·40	**60**	4	Jr	5○	·93		6	F	4	·46	7	Mr	4	·99
3	Au	29	·17	4	S	27	·70	6	O	37	·23	7	N	25	·76		2	D	25○	·29	**61**	3	Jr	28	·88	5	F	22	·36
2	S	17	·07	3	O	16	·60	5	N	15	·13	6	D	14	·66	**62**	1	Jr	13	·19		2	F	11	·72	4	Mr	13	·25
6	S	6	·44	7	O	5	·97	2	N	4○	·50	4	D	4	·08	**63**	5	Jr	2	·56		7	F	1	·09	1	Mr	2	·62
5	S	25	·33	6	O	24○	·87	1	N	23	·40	2	D	22	·93	**64**	4	Jr	21	·46		5	F	19	·99	7	Mr	20	·52
2	S	13	·70	4	O	13●○	·23	5	N	11	·76	7	D	11	·29	**65**	1	Jr	9	·82		3	F	8	·35	4	Mr	9	·89
7	S	3	·07	1	O	2	·60	3	N	1	·13	4	N	30	·66		6	D	30	·19	**66**	7	Jr	28	·72	2	F	27○	·25
5	S	21●	·97	7	O	21	·50	2	N	20	·03	3	D	19	·56	**67**	5	Jr	18	·09		6	F	16○	·62	1	Mr	18	·15
3	S	11	·33	1	O	10	·86	6	N	9	·39	7	D	8	·93	**68**	2	Jr	7	·46		3	F	5●○	·99	5	Mr	6	·52
7	Au	30	·70	2	S	29	·23	3	O	28	·76	5	N	27	·29		6	D	26	·82	**69**	1	Jr	25	·35	2	F	23	·88
6	S	18	·60	1	O	18	·13	2	N	16	·66	4	D	16○	·19	**70**	5	Jr	14	·72		7	F	13	·25	1	Mr	14	·78
3	S	7	·97	5	O	7	·50	7	N	6	·03	1	D	5○	·56	**71**	3	Jr	4	·09		4	F	2	·62	6	Mr	4	·15
{1 {2	Au S	28 26	·33 ·86	4	O	26	·39	5	N	24○	·92	7	D	24	·45	**72**	1	Jr	22	·98		3	F	21	·52	5	Mr	22	·05
{7	S	15	·23	1	O	14	·76	3	N	13	·29	4	D	12	·82	**73**	6	Jr	11	·35		7	F	9	·88	2	Mr	11	·41
4	S	4	·60	6	O	4○	·13	7	N	2	·66	2	D	2	·19		3	D	31	·72	**74**	5	Jr	30	·25	6	F	28	·78
3	S	23○	·49	5	O	23	·02	6	N	21	·56	1	D	21	·09	**75**	2	Jr	19	·62		4	F	18	·15	5	Mr	19●○	·68
7	S	12●○	86	2	O	12	·89	3	N	10	·92	5	D	10	·45	**76**	6	Jr	8	·98		1	F	7	·51	3	Mr	8	·04
5	S	1●	·23	6	S	30	·76	1	O	30	·29	2	N	28	·82		4	D	28	·85	**77**	5	Jr	26○	·88	7	F	25	·41
4	S	20	·13	5	O	19	·66	7	N	18	·19	1	D	17	·72	**78**	3	Jr	16○	·25		4	F	14	·78	6	Mr	16	·31
1	S	9	·49	3	O	9	·02	4	N	7	·55	6	D	7	·08	**79**	7	Jr	5○	·61		2	F	4	·15	3	Mr	5	·68
5	Au	29	·86	7	S	28	·39	1	O	27	·92	3	N	26	·45		4	D	25●	·98	**80**	6	Jr	24	·51	1	F	23	·04
4	S	16	·76	6	O	16	·29	7	N	14○	·82	2	D	14●	·35	**81**	3	Jr	12	·88		5	F	11	·41	6	Mr	12	·94
2	S	6	·12	3	O	5	·66	5	N	4○	·19	6	D	3●	·72	**82**	1	Jr	2	·25		2	Jr	31	·78	4	Mr	2	·81
1	S	25	·02	2	O	24○	55	4	N	23	·08	5	D	22	·61	**83**	7	Jr	21	·14		1	F	19	·68	3	Mr	21	·21
5	S	14	·39	6	O	13●	·92	1	N	12	·45	2	D	11	·98	**84**	4	Jr	10	·51		6	F	9	·04	7	Mr	9○	·57
2	S	2○	·76	4	O	2	·29	5	O	31	·82	7	N	30	·35		1	D	29	·88	**85**	3	Jr	28	·41	4	F	26○	·94
1	S	21	·65	3	O	21	·18	4	N	19	·72	6	D	19	·25	**86**	7	Jr	17	·78		2	F	16○	·31	3	Mr	17	·84
6	S	11	·02	7	O	10	·55	2	N	9	·08	3	D	8	·61	**87**	5	Jr	7	·14		6	F	5●	·67	1	Mr	7	·20
3	Au	31	·39	4	S	29	·92	6	O	29	·45	7	N	27	·98		2	D	27○	51	**88**	4	Jr	26	·04	5	F	24	·57
2	S	13	·29	3	O	17	·82	5	N	16	·35	6	D	15○	·88	**89**	1	Jr	14	·41		2	F	12	·94	4	Mr	14	·47
6	S	7	·65	1	O	7	·18	2	N	5	·71	4	D	5○	·24	**90**	5	Jr	3	·78		7	F	2	·31	1	Mr	3	·84
{4 {5	Au S	28 26	·02 ·55	7	O	26	·08	1	N	24●	·61	3	D	24	·14	**91**	4	Jr	22	·67		6	F	21	·20	7	Mr	22	·73
2	S	15	·92	4	O	15○	·45	5	N	13	·98	7	D	13	·51	**92**	2	Jr	12	·04		3	F	10	·57	5	Mr	11	·10
7	S	4	·28	1	O	3○	·82	3	N	2	·35	4	D	1	·88		6	D	31	·41	**93**	7	Jr	29	·94	2	F	28	·47
6	S	23●○	·18	7	O	22	·71	2	N	21	·24	3	D	20	·77	**94**	5	Jr	19	·30		6	F	17	·84	1	Mr	19●	·87
3	S	12	·55	5	O	12	·08	6	N	10	·61	1	D	10	·14	**95**	2	Jr	8	·67		4	F	7○	·20	5	Mr	8	·73
7	S	1	·92	2	O	1	·45	3	O	30	·98	5	N	29	·51		7	D	29	·04	**96**	1	Jr	27○	57	3	F	26	·10
6	S	19	·81	1	O	19	·34	2	N	17	·88	4	D	17	·41	**97**	5	Jr	15●○	·94		7	F	14	·47	2	Mr	16	·00
4	S	9	·18	5	O	8	·71	7	N	7	·24	1	D	6	·77	**98**	3	Jr	5●	·30		4	F	3	·83	6	Mr	5	·36
1	Au	29	·55	3	S	28	·08	4	O	27	·61	6	N	26○	·14		7	D	25	67	**99**	2	Jr	24	·20	3	F	22	·73
7	S	17	·45	1	O	16	·98	3	N	15○	·51	5	D	15	·04	**11**	6	Jr	13	·57	**00**	1	F	12	·10	2	Mr	12	·68
4	S	5	·81	6	O	5	·34	7	N	3○	·87	2	D	3	·40	**01**	3	Jr	1	·94		5	Jr	31	·47	7	Mr	2	·00
3	S	24	·71	5	O	24●	·24	6	N	22	·77	1	D	22	·30	**02**	2	Jr	20	·83		4	F	19	·36	5	Mr	20○	·89
1	S	14○	·08	2	O	13	·61	4	N	12	·14	5	D	11	·67	**03**	7	Jr	10	·20		1	F	8	·73	3	Mr	10●○	·26
5	S	3○	·44	6	O	2	·98	1	N	1	·51	3	D	1	·04		4	D	30	·57	**04**	6	Jr	29	·10	7	F	27○	·63
4	S	21	·34	5	O	20	·87	7	N	19	·40	1	D	18	·93	**05**	3	Jr	17	·46		5	F	16	·00	6	Mr	17	·53
1	S	10	·71	3	O	10	·24	4	N	8	·77	6	D	8	·30	**06**	7	Jr	6○	·83		2	F	5	·36	3	Mr	6	·89
6	Au	31	·08	7	S	29	·61	2	O	29	·14	3	N	27	·67		5	D	27●○	·20	**07**	6	Jr	25	·73	1	F	24	·26
4	S	18	·97	6	O	18	·50	1	N	17	·04	2	D	16●○	·56	**08**	4	Jr	15	·10		5	F	13	·63	7	Mr	14	·16

the above + ·01 for Ārya siddhānta and — ·05 for Brahma siddhānta.

TABLE II.—

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year		First new moon in solar year.	Anomaly of first new-moon	Christian era.	Vaiśākha.				Jyeshṭha.				Āshāḍha.				Śrāvaṇa.				Bhādrapada.			
			Month and day A.D.	Fraction of day			A.D.	Week-day.	Month	Day.	Fraction.	Week-day.	Month	Day.	Fraction.	Week-day.	Month.	Day.	Fraction	Week-day	Month.	Day.	Fraction.	Week-day	Month	Day.	Fraction.
4209	1165	1030	23M	·6853	20·0087	17·479	**1108**	1	Ap	12	·69	3	My	12	·22	4	Je	10●	·75	6	Jl	10	·28	7	Au	8	·81
4210	1166	1031	23M	·9440	9·1120	18·636	**1109**	6	Ap	2	·06	7	My	1○	·59	2	My	31●	·12	3	Je	29	·65	5	Jl	29	·18
4211	1167	1032	24M	·2028	27·7509	11·770	**1110**	4	Ap	20○	·95	6	My	20	·48	1	Je	19	·01	2	Jl	18	·54	4	Au	17	·08
4212	1168	1033	24M	·4615	16·8592	7·927	**1111**	2	Ap	10○	·32	3	My	9	·85	5	Je	8	·38	6	Jl	7	·91	1	Au	6	·44
4213	1169	1034	23M	·7203	5·9675	4·084	**1112**	6	Mr	29	·69	1	Ap	28	·22	2	My	27	·75	4 5	Je Jl	26 25	·28 ·81	7	Au	24	·34
4214	1170	1035	23M	·9791	24·6064	2·217	**1113**	5	Ap	17	·58	7	My	17	·12	1	Je	15	·65	3	Jl	15	·18	4	Au	13○	·71
4215	1171	1036	24M	·2378	18·7147	25·929	**1114**	2	Ap	6	·95	4	My	6	·48	6	Je	5	·01	7	Jl	4	·54	2	Au	3○	·07
4216	1172	1037	24M	·4966	2·8230	22·087	**1115**	7	Mr	27	·32	1 3	Ap My	25 25	·85 ·88	4	Je	23	·91	6	Jl	28●○	·44	7	Au	21	·97
4217	1173	1038	23M	7553	21·4619	20·220	**1116**	6	Ap	14	·22	7	My	13	·75	2	Je	12	·28	3	Jl	11	·81	5	Au	10	·34
4218	1174	1039	24M	·0141	10·5702	16·377	**1117**	3	Ap	3	·58	5	My	3	·11	6	Je	1○	·64	1	Jl	1	·18	2	Jl	30	·71
4219	1175	1040	24M	·2728	29·2090	14·510	**1118**	2	Ap	22	·48	4	My	22●○	·01	5	Je	20	·54	7	Jl	20	·07	1	Au	18	·60
4220	1176	1041	24M	·5316	18·8173	10·668	**1119**	6	Ap	11	·85	1	My	11●	·38	2	Je	9	·91	4	Jl	9	·44	5	Au	7	·97
4221	1177	1042	23M	·7904	7·4256	6·825	**1120**	4	Mr	31○	·22	5	Ap	29	·75	7	My	29	·28	1	Je	27	·81	3 4	Jl Au	27 25	·34 ·87
4222	1178	1043	24M	·0491	26·0645	4·958	**1121**	3	Ap	19	·11	4	My	18	·64	6	Je	17	·17	7	Jl	16	·70	2	Au	15	·24
4223	1179	1044	24M	·3079	15·1728	1·115	**1122**	7	Ap	8	·48	2	My	8	·01	3	Je	6	·54	5	Jl	6	·07	6	Au	4	·60
4224	1180	1045	24M	·5666	4·2811	24·827	**1123**	4	Mr	28	·85	6	Ap	27	·38	7 2	My Je	26 25	·91 ·44	3	Jl	24	·97	5	Au	23●	·50
4225	1181	1046	23M	8254	22·9200	22·960	**1124**	3	Ap	15	·74	5	My	15	·27	6	Je	13	·80	1	Jl	13○	·34	2	Au	11●	·87
4226	1182	1047	24M	·0841	12·0283	19·118	**1125**	1	Ap	5	·11	2	My	4	·64	4	Je	3	·17	5	Jl	2○	·70	7	Au	1	·28
4227	1183	1048	24M	·3429	1·1366	15·275	**1126**	5	Mr	25	·48	7 1	Ap My	24 23	·01 ·54	3	Je	22●○	·07	4	Jl	21	·60	6	Au	20	·13
4228	1184	1049	24M	6016	19·7755	13·408	**1127**	4	Ap	13	·38	5	My	12○	·91	7	Je	11	·44	1	Jl	10	·97	3	Au	9	·50
4229	1185	1050	23M	·8604	8·8838	9·565	**1128**	1	Ap	1	·74	3	My	1○	·27	4	My	30	·80	6	Je	29	·34	7	Jl	28	·87
4230	1186	1051	24M	·1192	27·5227	7·609	**1129**	7	Ap	20●○	·64	2	My	20	·17	3	Je	18	·70	5	Jl	18	·23	6	Au	16	·76
4231	1187	1052	24M	·3779	16·6310	3·856	**1130**	5	Ap	10	·01	6	My	9	·54	1	Je	8	·07	2	Jl	7	·60	4	Au	6	·13
4232	1188	1053	24M	·6367	5·7393	0·013	**1131**	2	Mr	30	·38	3	Ap	28	91	5 6	My Je	28 26	·44 ·97	1	Jl	26	·50	3	Au	25○	·03
4233	1189	1054	23M	·8954	24·3782	25·701	**1132**	1	Ap	17	·27	2	My	16	·80	4	Je	15	·33	5	Jl	14	·86	7	Au	13○	·40
4234	1190	1055	24M	·1542	13·4865	21·858	**1133**	5	Ap	6	·64	7	My	6	·17	1	Je	4	·70	3	Jl	4	·23	4	Au	2●○	·76
4235	1191	1056	24M	·4129	2·5948	18·015	**1134**	3	Mr	27	·01	4 6	Ap My	25 25	·54 ·07	7	Je	23	·60	2	Jl	23●	·13	3	Au	21	·66
4236	1192	1057	24M	·6717	21·2336	16·149	**1135**	1	Ap	14	·90	3	My	14	·44	4	Je	12○	·97	6	Jl	12	·50	1	Au	11	·03
4237	1193	1058	23M	·9305	10·3419	12·306	**1136**	6	Ap	3	·27	7	My	2	·80	2	Je	1○	·33	3	Je	30	·86	5	Jl	30	·39
4238	1194	1059	24M	·1892	28·9808	10·439	**1137**	5	Ap	22	·17	6	My	21	·70	1	Je	20	28	2	Jl	19	·76	4	Au	18	·29
4239	1195	1060	24M	·4480	18·0891	6·596	**1138**	2	Ap	11○	·54	4	My	11	·07	5	Je	9	·60	7	Jl	9	·13	1	Au	7	·66
4240	1196	1061	24M	·7067	7·1974	2·754	**1139**	6	Mr	31○	·90	1	Ap	30	·43	2	My	29	·96	4 6	Je Jl	28 28	·50 ·03	7	Au	26	·56
4241	1197	1062	23M	·9655	25·8363	0·887	**1140**	5	Ap	18	·80	7	My	18	·33	1	Je	16	·86	3	Jl	16	·39	4	Au	14	·92
4242	1198	1063	24M	·2242	14·9446	24·599	**1141**	3	Ap	8	·17	4	My	7	·70	6	Je	6	·23	7	Jl	5	·76	2	Au	4	·29
4243	1199	1064	24M	·4830	4·0529	20·756	**1142**	7	Mr	28	54	2	Ap	27	·07	3 5	My Je	26 25	·60 ·13	6	Jl	24○	·66	1	Au	23	·19
4244	1200	1065	24M	·7418	22·6918	18·889	**1143**	6	Ap	16	·43	7	My	15	·96	2	Je	14	·49	4	Jl	14○	·02	5	Au	12●	·56
4245	1201	1066	24M	·0005	11·8001	15·047	**1144**	3	Ap	4	·80	5	My	4	·33	6	Je	2	·86	1	Jl	2○	·39	2	Jl	31	·92
4246	1202	1067	24M	·2593	0·9084	11·204	**1145**	1 2	Mr Ap	25 23	·17 ·70	4	My	23○	·23	5	Je	21●	·76	7	Jl	21	·29	1	Au	19	·82
4247	1203	1068	24M	·5180	19·5478	9·337	**1146**	7	Ap	13	·06	1	My	12○	·60	3	Je	11●	·13	4	Jl	10	·66	6	Au	9	·19
4248	1204	1069	24M	·7768	8·6555	5·494	**1147**	4	Ap	2	48	5	My	1○	·96	7	My	31	·49	2	Je	30	·02	3 5	Jl Au	29 28	·55 ·08
4249	1205	1070	24M	·0355	27·2945	3·628	**1148**	3	Ap	20●	·38	4	My	19	·86	6	Je	18	·39	7	Jl	17	·92	2	Au	16	·45
4250	1206	1071	24M	·2943	16·4028	27·339	**1149**	7	Ap	9	·70	2	My	9	·23	3	Je	7	·76	5	Jl	7	·29	6	Au	5	·82
4251	1207	1072	24M	·5530	5·5111	23·497	**1150**	5	Mr	30	·06	6	Ap	28	·59	1 2	My Je	28 26	·12 ·66	4	Jl	26	·18	5	Au	24○	·72
4252	1208	1073	24M	·8118	24·1500	21·630	**1151**	3	Ap	17	·96	5	My	17	·49	7	Je	16	·02	1	Jl	15	·55	3	Au	14○	·08
4253	1209	1074	24M	·0706	13·2583	17·787	**1152**	1	Ap	6	·33	2	My	5	·86	4	Je	4	·39	5	Jl	3	·92	7	Au	2	·45
4254	1210	1075	24M	·3293	2·3666	13·944	**1153**	5	Mr	26	·70	7 1	Ap My	25 24	·23 ·76	3	Je	23○	·29	4	Jl	22●	·82	6	Au	21	·35
4255	1211	1076	24M	·5881	21·0054	12·078	**1154**	4	Ap	14	·59	6	My	14	·12	7	Je	12○	·65	2	Jl	12	·18	3	Au	10	·72
4256	1212	1077	24M	·8468	10·1137	8·235	**1155**	1	Ap	3	·96	3	My	3	·49	5	Je	2●○	·02	6	Jl	1	·55	1	Jl	31	·08
4257	1213	1078	24M	·1056	28·7526	6·368	**1156**	7	Ap	21○	·86	2	My	21●	·39	3	Je	19	·92	5	Jl	19	·45	6	Au	17	·98
4258	1214	1079	24M	·3643	17·8609	2·525	**1157**	5	Ap	11○	·22	6	My	10	·76	1	Je	9	·29	2	Jl	8	·82	4	Au	7	·35
4259	1215	1080	24M	·6231	6·9692	28·287	**1158**	2	Mr	31○	·59	4	Ap	30	·12	5	My	29	·65	7 1	Je Jl	28 27	·18 ·71	3	Au	26	·24
4260	1216	1081	24M	·8819	25·6081	24·370	**1159**	1	Ap	19	·49	3	My	19	·02	4	Je	17	·55	6	Jl	17	·08	7	Au	15	·61
4261	1217	1082	24M	·1406	14·7164	20·527	**1160**	5	Ap	7	·86	7	My	7	·39	1	Je	5	·92	3	Jl	5	·45	4	Au	3○	·98
4262	1218	1083	24M	·3994	3·8247	16·685	**1161**	3	Mr	28	·22	4	Ap	26	·75	6 7	My Je	26 24	·28 ·82	2	Jl	24○	·35	3	Au	22	·88
4263	1219	1084	24M	·6581	22·4636	14·818	**1162**	2	Ap	16	·12	3	My	15	·65	5	Je	14	·18	6	Jl	13●○	·71	1	Au	12	·24

N.B.—For tithis by other siddhāntas add algebraically to

Sūrya siddhānta—*cont.*

Āśvina.				Kārttika.				Mārgaśirsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day	Month.	Day.	Fraction.	Week-day	Month.	Day	Fraction.	Week-day.	Month	Day.	Fraction	Week-day.	Month.	Day	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day	Fraction.	Week-day.	Month.	Day.	Fraction.
2	S	7	·34	3	O	6	·87	5	N	5	·40	6	D	4	·93	09	1	Jr	3	46		2	F	1	·99	4	Mr	3	·52
6 1	Au S	27 26	·71 ·24	2	O	25○	·77	4	N	24●	·30	5	D	23	·88	10	7	Jr	22	·86		1	F	20	·89	3	Mr	22	·42
5	S	15	·61	7	O	15●○	·14	1	N	13	·67	3	D	13	·20	11	4	Jr	11	·73		6	F	10	·26	7	Mr	11	·79
2	S	4	·97	4	O	4○	·50	6	N	3	·08	7	D	2	·56	12	2	Jr	1	·10		3	Jr	30	·63	5	F	29	·16
1	S	22	·87	3	O	22	·40	4	N	20	·93	6	D	20	·46	13	7	Jr	18	99		2	F	17○	·52	4	Mr	19●	·05
6	S	12	·24	7	O	11	·77	2	N	10	·30	3	D	9	·83	14	5	Jr	8	·36		6	F	6○	·89	1	Mr	8	42
3	S	1	.60	5	O	1	·14	6	O	30	·67	1	N	29	·20		2	D	28	·73	15	4	Jr	27○	26	5	F	25	·79
2	S	20	·50	4	O	20	·08	5	N	18	·56	7	D	18	·09	16	1	Jr	16	·62		3	F	15	·16	4	Mr	15	·69
6	S	8	87	1	O	8	·40	2	N	6	·93	4	D	6○	·46	17	5	Jr	4	99		7	F	3	·52	2	Mr	5	·05
4	Au	29	·24	5	S	27	·77	7	O	27	·80	1	N	25○	·83		3	D	25	·86	18	4	Jr	23	·89	6 7	F Mr	22 23	42 ·95
3	S	17	·13	4	O	16	·66	6	N	15●○	·20	7	D	14	·73	19	2	Jr	13	26		3	F	11	·79	5	Mr	18	·32
7	S	6	·50	2	O	6	·03	3	N	4	·56	5	D	4	·09	20	6	Jr	2	62		1	F	1	·15	2	Mr	1	·68
6	S	24○	·40	7	O	23●	·93	2	N	22	·46	3	D	21	·99	21	5	Jr	20	·52		7	F	19	·05	1	Mr	20○	·58
3	S	13○	·77	5	O	13	·30	6	N	11	·83	1	D	11	·36	22	2	Jr	9	·89		4	F	8	42	5	Mr	9●○	·95
1	S	3○	·13	2	O	2	·66	4	N	1	·19	5	N	30	·72		7	D	30	·26	23	1	Jr	28	·79	3	F	27	32
7	S	22	·03	1	O	21	·56	3	N	20	·09	4	D	19	·62	24	6	Jr	18○	·15		7	F	16	68	2	Mr	17	·21
4	S	10	·40	5	O	9	·93	7	N	8	·46	1	D	7	·99	25	3	Jr	6○	·52		5	F	5	·05	6	Mr	6	·58
1	Au	30	76	3	S	29	·30	4	O	28	83	6	N	27	36		7	D	26○	89	26	2	Jr	25	·42	3	F	28	·95
7	S	18	66	2	O	18	·19	3	N	16	·72	5	D	16	·25	27	6	Jr	14	·78		1	F	13	32	2	Mr	14	·85
5	S	8	·03	6	O	7	·56	1	N	6○	·09	2	D	5	·62	28	4	Jr	4	·15		5	F	2	·68	7	Mr	3	·21
2 3	Au S	27 25	·40 93	5	O	25○	·46	6	N	23	·99	1	D	23	·52	29	3	Jr	22	·05		4	F	20	·58	6	Mr	22	·11
1	S	15	29	2	O	14●○	82	4	N	13	·36	5	D	12	·89	30	7	Jr	11	·42		1	F	9	·95	3	Mr	11	·48
5	S	4	66	7	O	4●	·19	1	N	2	72	3	D	2	·25		4	D	31	·78	31	6	Jr	30	·31	7	F	28○	·84
4	S	23●	56	6	O	23	·09	7	N	21	·62	2	D	21	·15	32	3	Jr	19	·68		5	F	18○	·21	6	Mr	18	·74
1	S	11	93	3	O	11	·46	4	N	9	·99	6	D	9	·52	33	1	Jr	8	·05		2	F	6○	·58	4	Mr	8	·11
6	S	1	·29	7	S	30	·82	2	O	30	·35	3	N	28	88		5	D	28	42	34	6	Jr	26●	·95	1	F	25	·48
5	S	20	·19	6	O	19	72	1	N	18	25	2	D	17○	·78	35	4	Jr	16●	·31		5	F	14	·84	7	Mr	16	·37
2	S	9	·56	4	O	9	·09	5	N	7	·62	7	D	7○	15	36	1	Jr	5	·68		3	F	4	·21	4	Mr	4	·74
6	Au	28	·92	1	S	27	·46	2	O	26	·99	4	N	25○	·52		6	D	25	·05	37	7	Jr	23	·58	2 3	F Mr	22 28	·11 ·64
5	S	16	82	7	O	16	85	1	N	14●	·88	3	D	14	·41	38	4	Jr	12	·94		6	F	11	·48	1	Mr	18	·01
3	S	6	·19	4	O	5○	·72	6	N	4	25	7	D	3	·78	39	2	Jr	2	31		3	Jr	31	·84	5	Mr	2	37
2	S	25○	·09	3	O	24	62	5	N	23	·15	6	D	22	·68	40	1	Jr	21	·21		2	F	19	·74	4	Mr	20○	·27
6	S	13●○	45	7	O	12	·98	2	N	11	·52	4	D	11	·05	41	5	Jr	9	·58		7	F	8	·11	1	Mr	9●	·64
3	S	2●	·82	5	O	2	·35	6	O	31	·88	1	N	30	·41		2	D	29	·94	42	4	Jr	28○	·47	6	F	27	·00
2	S	21	·72	4	O	21	·25	5	N	19	·78	7	D	19	·81	43	1	Jr	17○	84		3	F	16	·37	4	Mr	17	·90
7	S	11	·09	1	O	10	62	3	N	9	·15	4	D	8	·68	44	6	Jr	7○	·21		7	F	5	·74	2	Mr	6	·27
4	Au	30	·45	5	S	28	·98	7	O	28	51	2	N	27	·04		3	D	26●	·58	45	5	Jr	25	·11	6	F	23	64
3	S	18	·35	4	O	17	·88	6	N	16○	·41	7	D	15	94	46	2	Jr	14	·47		4	F	13	·00	5	Mr	14	·53
7	S	7	·72	2	O	7	·25	3	N	5○	·78	5	D	5	·81	47	6	Jr	3	·84		1	F	2	·37	2	Mr	3	·90
6	S	26	·62	1	O	26●○	·15	2	N	24	·68	4	D	24	·21	48	5	Jr	22	·74		7	F	21	·27	1	Mr	21	80
3	S	14	98	5	O	14	·51	7	N	13	·04	1	D	12	·57	49	3	Jr	11	·10		4	F	9	·64	6	Mr	11○	·17
1	S	4○	·35	2	O	3	·88	4	N	2	·41	5	D	1	·94		7	D	31	·47	50	2	Jr	30	·00	3	F	28○	·53
7	S	23	25	1	O	22	·78	3	N	21	·31	4	D	20	·84	51	6	Jr	19	·87		7	F	17●○	·90	2	Mr	19	43
4	S	12	61	6	O	12	·14	7	N	10	·68	2	D	10	·21	52	3	Jr	8	74		5	F	7●	·27	6	Mr	7	·80
1	Au	31	·98	3	S	30	51	5	O	30	04	6	N	28	·57		1	D	28○	·10	53	2	Jr	26●	·63	4	F	25	16
7	S	19	88	2	O	19	·41	3	N	17	·94	5	D	17○	·47	54	7	Jr	16	·00		1	F	14	·53	3	Mr.	16	·06
5	S	9	25	6	O	8	·78	1	N	7	31	2	D	6○	·84	55	4	Jr	5	·37		5	F	3	·90	7	Mr	5	·43
2	An	29	·61	4	S	28	14	5	O	27	·67	7	N	26●	·20		1	D	25	·74	56	3 4	Jr F	24 22	·27 ·80	6	Mr	23	·33
1	S	16	·51	3	O	16○	·04	4	N	14	·57	6	D	14	·10	57	7	Jr	12	·63		2	F	11	16	3	Mr	12	·69
5	S	5	88	7	O	5○	·41	1	N	3	·94	3	D	3	·47	58	5	Jr	2	·00		6	Jr	31	·53	1	Mr	2	·06
4	S	24○	·78	6	O	24	·31	7	N	22	84	2	D	22	·37	59	3	Jr	20	·90		5	F	19	·43	6	Mr	20	·96
2	S	14	14	3	O	13	67	5	N	12	20	6	D	11	73	60	1	Jr	10	·26		2	F	8○	·80	4	Mr	9	·38
6	S	2●	·51	1	O	2	·04	2	O	31	·57	4	N	30	·10		5	D	29	·63	61	7	Jr	28●○	16	1	F	26	·69
5	S	21	·41	6	O	20	94	1	N	19	·47	3	D	19	·00	62	4	Jr	17●○	·53		6	F	16	·06	7	Mr	17	·59
2	S	10	·77	4	O	10	·30	5	N	8	·84	7	D	8	37	63	1	Jr	6	·90		3	F	5	·43	4	Mr	6	·96

the above + ·02 for Ārya siddhānta and — ·06 for Brahma siddhānta.

TABLE II.—

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era.	Vaiśākha. Week day.	Vaiśākha. Month.	Vaiśākha. Day.	Vaiśākha. Fraction.	Jyeshṭha. Week-day.	Jyeshṭha. Month	Jyeshṭha. Day.	Jyeshṭha. Fraction.	Āshāḍha. Week-day.	Āshāḍha. Month.	Āshāḍha. Day.	Āshāḍha. Fraction	Śrāvaṇa. Week-day.	Śrāvaṇa. Month.	Śrāvaṇa. Day.	Śrāvaṇa. Fraction.	Bhādrapada. Week-day.	Bhādrapada. Month.	Bhādrapada. Day.	Bhādrapada. Fraction.
							A.D.																				
4264	1220	1085	24M	·9169	11·5719	10·975	**1163**	6	Ap	5	·49	1	My	5	·02	2	Je	3○	·55	4	J	3●	·08	5	Au	1	·61
4265	1221	1086	24M	·1756	0·6802	7·138	**1164**	3 5	Mr Ap	24 23	·86 ·39	6	My	22○	·92	1	Je	21●	·45	2	Jl	20	·98	4	Au	19	·51
4266	1222	1087	24M	·1344	19·3191	5·266	**1165**	2	Ap	12	·75	4	My	12○	·28	5	Je	10	·81	7	Jl	10	·34	1	Au	8	·88
4267	1223	1088	24M	·6932	8·4273	1·423	**1166**	7	Ap	2	·12	1	My	1●	·65	3	My	31	·18	4	Je	29	·71	6 7	Jl Au	29 27	·24 ·77
4268	1224	1089	24M	9519	27·0663	27·111	**1167**	6	Ap	21●	·02	7	My	20	·55	2	Je	19	·08	3	Jl	18	·61	5	Au	17	·14
4269	1225	1090	24M	·2107	16·1746	23·268	**1168**	3	Ap	9	·38	4	My	8	·92	6	Je	7	·45	7	Jl	6	·98	2	Au	5	·51
4270	1226	1091	24M	·4694	5·2829	19·426	**1169**	7	Mr	29	·75	2	Ap	28	·28	3	My	27	·81	5 6	Je Jl	26 25	·34 ·87	1	Au	24●○	·40
4271	1227	1092	24M	·7282	23·9218	17·559	**1170**	6	Ap	17	·65	1	My	17	·18	2	Je	15	·71	4	Jl	15	·24	5	Au	13	·77
4272	1228	1093	24M	·9869	13·0801	13·716	**1171**	4	Ap	7	·02	5	My	6	·55	7	Je	5	·08	1	Jl	4○	·61	3	Au	3	·14
4273	1229	1094	24M	·2457	2·1384	9·873	**1172**	1	Mr	26	·38	2 4	Ap My	24 24	·91 ·44	5	Je	22○	·98	7	Jl	22	·51	2	Au	21	·04
4274	1230	1095	24M	·5044	20·7772	8·006	**1173**	7	Ap	14	·28	1	My	13	·81	3	Je	12●○	·34	4	Jl	11	·87	6	Au	10	·40
4275	1231	1096	24M	·7632	9·8855	4·164	**1174**	4	Ap	3	·65	6	My	3○	·18	7	Je	1●	·71	2	Jl	1	·24	3	Jl	30	·77
4276	1232	1097	25M	·0220	28·5244	2·297	**1175**	3	Ap	22○	·55	5	My	22	·08	6	Je	20	·61	1	Jl	20	·14	2	Au	18	·67
4277	1233	1098	24M	·2807	17·6327	26·008	**1176**	7	Ap	10●○	·91	2	My	10	·44	3	Je	8	·97	5	Jl	8	·50	7	Au	7	·04
4278	1234	1099	24M	·5395	6·7410	22·171	**1177**	5	Mr	31	·28	6	Ap	29	·81	1	My	29	·34	2 4	Je Jl	27 27	·87 ·40	5	Au	25	·93
4279	1235	1100	24M	7982	25·3799	20·299	**1178**	4	Ap	19	·18	5	My	18	·71	7	Je	17	·24	1	Jl	16	·77	3	Au	15○	·30
4280	1236	1101	25M	·0570	14·4882	16·457	**1179**	1	Ap	8	·54	3	My	8	·08	4	Je	6	·61	6	Jl	6	·14	7	Au	4○	·67
4281	1237	1102	24M	·3157	3·5965	12·614	**1180**	5	Mr	27	·91	7	Ap	26	·44	1 3	My Je	25 24	·97 ·50	5	Jl	24●○	·03	6	Au	22	·56
4282	1238	1103	24M	·5745	22·2354	10·747	**1181**	4	Ap	15	·81	6	My	15	·34	7	Je	13	·87	2	Jl	13	·40	3	Au	11	·93
4283	1239	1104	24M	·8333	11·3437	6·904	**1182**	2	Ap	5	·18	3	My	4	·71	5	Je	3○	·24	6	Jl	2	·77	1	Au	1	·30
4284	1240	1105	25M	0920	0·4520	3·062	**1183**	6 1	Mr Ap	25 24	·54 ·07	2	My	23●○	·60	4	Je	22	·14	5	Jl	21	·67	7	Au	20	·20
4285	1241	1106	24M	·3508	19·0909	1·195	**1184**	5	Ap	12	·44	6	My	11	·97	1	Je	10	·50	3	Jl	10	·03	4	Au	8	·56
4286	1242	1107	24M	·6095	8·1992	24·907	**1185**	2	Ap	1○	·81	4	My	1●	·34	5	My	30	·87	7	Je	29	·40	1 3	Jl Au	28 27	·93 ·46
4287	1243	1108	24M	·8683	26·8381	23·040	**1186**	1	Ap	20	·71	3	My	20	·24	4	Je	18	·77	6	Jl	18	·30	7	Au	16	·83
4288	1244	1109	25M	·1270	15·9464	19·197	**1187**	6	Ap	10	·07	7	My	9	60	2	Je	8	·13	3	Jl	7	·66	5	Au	6	·20
4289	1245	1110	24M	·3858	5·0547	15·354	**1188**	3	Mr	29	·44	4	Ap	27	·97	6	My	27	·50	1 2	Je Jl	26 25	·03 ·56	4	Au	24●	·10
4290	1246	1111	24M	·6445	23·6936	13·488	**1189**	2	Ap	17	·34	3	My	16	·87	5	Je	15	·40	6	Jl	14○	·93	1	Au	13	·46
4291	1247	1112	24M	·9033	12·8019	9·645	**1190**	6	Ap	6	·70	1	My	6	·24	2	Je	4	·77	4	Jl	4●○	·30	5	Au	2	·83
4292	1248	1113	25M	·1621	1·9101	5·802	**1191**	4	Mr	27	·07	5 7	Ap My	25 25	·60 ·13	1	Je	23●○	·66	3	Jl	23	·19	4	Au	21	·72
4293	1249	1114	24M	·4208	20·5490	3·935	**1192**	2	Ap	13	·97	4	My	13○	·50	6	Je	12	·03	7	Jl	11	·56	2	Au	10	·09
4294	1250	1115	24M	·6796	9·6573	0·093	**1193**	7	Ap	3	·34	1	My	2○	·87	3	Je	1●	·40	4	Je	30	·93	6	Jl	30	·46
4295	1251	1116	24M	·9383	28·2962	25·780	**1194**	6	Ap	22○	·23	7	My	21	·76	2	Je	20	·30	3	Jl	19	·83	5	Au	18	·36
4296	1252	1117	25M	·1971	17·4045	21·938	**1195**	3	Ap	11●	·60	5	My	11	·13	6	Je	9	·66	1	Jl	9	·19	2	Au	7	·72
4297	1253	1118	24M	·4558	6·5128	18·095	**1196**	7	Mr	30	·97	2	Ap	29	·50	4	My	29	·03	5 7	Je Jl	27 27	·56 ·09	1	Au	25○	·62
4298	1254	1119	24M	·7146	25·1517	16·228	**1197**	6	Ap	18	·87	1	My	18	·40	2	Je	16	·93	4	Jl	16	·46	5	Au	14○	·99
4299	1255	1120	24M	·9734	14·2600	12·385	**1198**	4	Ap	8	·23	5	My	7	·76	7	Je	6	·29	1	Jl	5	·82	3	Au	4○	·36
4300	1256	1121	25M	·2321	3·3683	8·543	**1199**	1	Mr	28	·60	3	Ap	27	·13	4 6	My Je	26 25	·66 ·19	7	Jl	24	·72	2	Au	23	·25
4301	1257	1122	24M	·4909	22·0072	6·676	**1200**	7	Ap	15	·50	2	My	15	·03	3	Je	13○	·56	5	Jl	13	·09	6	Au	11	·62
4302	1258	1123	24M	·7496	11·1155	2·834	**1201**	4	Ap	4	·86	6	My	4	·40	7	Je	2○	·93	2	Jl	2	·46	3	Jl	31	·99
4303	1259	1124	25M	·0084	0·2238	26·545	**1202**	2 3	Mr Ap	25 23	·23 ·76	5	My	23●	·29	6	Je	21	·82	1	Jl	21	·35	2	Au	19	·88
4304	1260	1125	25M	·2671	18·8627	24·679	**1203**	1	Ap	13○	·13	2	My	12	·66	4	Je	11	·19	5	Jl	10	·72	7	Au	9	·25
4305	1261	1126	24M	·5259	7·9710	20·836	**1204**	5	Ap	1○	·50	7	My	1	·03	1	My	30	·56	3	Je	29	·09	4 6	Jl Au	28 27	·62 ·15
4306	1262	1127	24M	·7847	26·6099	18·969	**1205**	4	Ap	20	·39	5	My	19	·92	7	Je	18	·46	1	Jl	17	·99	3	Au	16	·52
4307	1263	1128	25M	·0434	15·7182	15·126	**1206**	1	Ap	9	·76	3	My	9	·29	4	Je	7	·82	6	Jl	7	·35	7	Au	5	·88
4308	1264	1129	25M	·3022	4·8265	11·284	**1207**	6	Mr	30	·13	7	Ap	28	·66	2 3	My Je	28 26	·19 ·72	5	Jl	26○	·25	6	Au	24●	·78
4309	1265	1130	24M	·5609	23·4658	9·417	**1208**	5	Ap	17	·03	6	My	16	·56	1	Je	15	·09	2	Jl	14○	·62	4	Au	13	·15
4310	1266	1131	24M	·8197	12·5736	5·574	**1209**	2	Ap	6	·39	3	My	5	·92	5	Je	4	·45	6	Jl	3○	·98	1	Au	2	·52
4311	1267	1132	25M	·0784	1·6819	1·731	**1210**	6	Mr	26	·76	1 2	Ap My	25 24	·29 ·82	4	Je	23	·35	5	Jl	22	·88	7	Au	21	·41
4312	1268	1133	25M	·3372	20·3208	27·419	**1211**	5	Ap	14	·66	7	My	14○	·19	1	Je	12	·72	3	Jl	12	·25	4	Au	10	·78
4313	1269	1134	24M	·5959	9·4291	23·577	**1212**	3	Ap	3	·02	4	My	2○	·56	6	Je	1	·09	7	Je	30	·62	2	Jl	30	·15
4314	1270	1135	24M	·8547	28·0680	21·710	**1213**	1	Ap	21●	92	3	My	21	·45	4	Je	19	·98	6	Jl	19	·51	1	Au	18	·04
4315	1271	1136	25M	·1135	17·1763	17·867	**1214**	6	Ap	11	·29	7	My	10	·82	2	Je	9	·35	3	Jl	8	·88	5	Au	7	·41
4316	1272	1137	25M	·3722	6·2846	14·024	**1215**	3	Mr	31	·66	5	Ap	30	·19	6	My	29	·72	1 2	Je Jl	28 27	·25 ·78	4	Au	26○	·31
4317	1273	1138	24M	·6310	24·9235	12·158	**1216**	2	Ap	18	·55	4	My	18	·08	5	Je	16	·62	7	Jl	16	·15	1	Au	14○	·68

N.B.—For tithis by other siddhāntas, add to the above algebraically as follows :—

Sūrya siddhānta—*cont.*

Āśvina.				Kārttika.				Mārgaśīrsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month	Day.	Fraction	Week-day.	Month.	Day.	Fraction.
7	Au	31	·14	1	S	29	·67	3	O	29	·20	4	N	27○	·73		6	D	27	·26	64	7	Jr	25	·79	2	F	24	·32
6	S	18	·04	7	O	17	·57	2	N	16●○	·10	3	D	15	·68	65	5	Jr	14	·16		6	F	12	·69	1	Mr	14	·22
3	S	7	·41	4	O	6	·94	6	N	5○	·47	1	D	5	·00	66	2	Jr	3	·53		4	F	2	·06	5	Mr	3	·59
2	S	26	·30	3	O	25	·83	5	N	24	·36	6	D	23	·90	67	1	Jr	22	·43		2	F	20	·96	4	Mr	22○	·49
6	S	15○	·67	1	O	15	·20	2	N	13	·73	4	D	13	·26	68	5	Jr	11	·79		7	F	10	·32	1	Mr	10○	·85
4	S	4●○	·04	5	O	3	·57	7	N	2	·10	1	D	1	·63		3	D	31	·16	69	4	Jr	29	·69	6	F	28○	·22
2	S	22	·93	4	O	22	·47	6	N	21	·00	7	D	20	·58	70	2	Jr	.19	·06		3	F	17	·59	5	Mr	19	·12
7	S	12	·30	1	O	11	·83	3	N	10	36	4	D	9	·89	71	6	Jr	8○	·42		7	F	6	·96	2	Mr	8	·49
4	S	1	·67	6	O	1	·20	7	O	30	·73	2	N	29	·26		3	D	28○	·79	72	5	Jr	27●	·32	6	F	25	·85
3	S	19	·57	5	O	19	·10	6	N	17	·63	1	D	17○	·16	73	2	Jr	15	·69		4	F	14	·22	5	Mr	15	·75
7	S	8	·93	2	O	8	·46	4	N	7	·00	5	D	6	·53	74	7	Jr	5	·06		1	F	3	·59	3	Mr	5	·12
5	Au	29	·30	6	S	27	·83	1	O	27○	·36	2	N	25●	·89		4	D	25	·42	75	5	Jr	28	·95	7 2	F Mr	22 24	·48 ·01
4	S	17	·20	5	O	16○	·73	7	N	15	·26	1	D	14	79	76	3	Jr	13	·82		4	F	11	·85	6	Mr	12	·88
1	S	5	·57	3	O	5○	·10	4	N	3	·63	6	D	3	·16	77	7	Jr	1	·69		3	Jr	31	·22	3	Mr	1	·75
7	S	24	·46	1	O	23	·99	3	N	22	·52	5	D	22	·06	78	6	Jr	20	·59		1	F	19○	·12	2	Mr	20●	·65
4	S	13●	·83	6	O	18	·36	7	N	11	·89	2	D	11	·42	79	3	Jr	9	·95		5	F	8○	·48	7	Mr	10	·01
2	S	3	·20	3	O	2	·73	5	N	1	·26	6	N	30	·79		1	D	30	·32	80	2	Jr	28○	·85	4	F	27	·88
1	S	21	·10	2	O	20	·63	4	N	19	·16	5	D	18	·69	81	7	Jr	17●	·22		1	F	15	·75	3	Mr	17	·28
5	S	10	·46	6	O	9	·99	1	N	8	·52	3	D	8○	·05	82	4	Jr	6	·58		6	F	5	·12	7	Mr	6	·65
2	Au	30	·83	4	S	29	·36	5	O	28	·89	7	N	27○,	·42		1	D	26	·95	83	3	Jr	25	·48	5	F	24	·01
1	S	18	·73	3	O	18	·26	4	N	16●○	·79	6	D	16	·32	84	7	Jr	14	·85		2	F	13	·38	3	Mr	13	·91
6	S	7	·09	7	O	6	·62	2	N	5	·16	3	D	4	69	85	5	Jr	3	·22		6	F	1	·75	1	Mr	3	·28
4	S	25○	·99	6	O	25●	·52	1	N	24	·05	2	D	23	·58	86	4	Jr	22	·11		5	F	20	·64	7	Mr	22○	·18
2	S	15○	·36	3	O	14	·89	5	N	13	·42	6	D	12	·95	87	1	Jr	11	·48		3	F	10	·01	4	Mr	11○	·54
6	S	4●○	·73	1	O	4	·26	2	N	2	·79	4	D	2	32		5	D	31	·85	88	7	Jr	30	·88	1	F	28●	91
5	S	22	·62	7	O	22	·15	1	N	20	·68	3	D	20	·22	89	4	Jr	18○	·75		6	F	17●	·28	7	Mr	18	·81
2	S	11	99	4	O	11	·52	6	N	10	·05	7	D	9	·58	90	2	Jr	8○	·11		3	F	6	·64	5	Mr	8	·17
7	S	1	·36	1	S	30	·89	3	O	30	·42	4	N	28	·95		6	D	28○	·48	91	1	Jr	27	·01	2	F	25	·54
6	S	20	·26	7	O	19	·79	2	N	18	·32	3	D	17●	·85	92	5	Jr	16	·38		6	F	14	·91	1	Mr	15	·44
3	S	8	·62	5	O	8	·15	6	N	6○	·68	1	D	6	·21	93	2	Jr	4	·74		4	F	3	·28	5	Mr	4	·81
7 2	Au S	28 27	·99 ·52	4	O	27○	·05	5	N	25	·58	**Pausha. Kshaya.**					7	D	25	·11	94	1	Jr	23	·64	3 4	F Mr	22 23	·17 ·70
6	S	16	·89	1	O	16○	·42	2	N	14	·95	4	D	14	48	95	6	Jr	18	00		7	F	11	·54	2	Mr	13	·07
4	S	6	·25	5	O	5●	·78	7	N	4	·32	1	D	3	85	96	3	Jr	2	·38		4	Jr	31	·91	6	Mr	1○	·44
3	S	24	·15	4	O	23	·68	6	N	22	·21	7	D	21	·74	97	2	Jr	20	·27		3	F	18○	·80	5	Mr	20	·34
7	S	13●	·52	2	O	13	·05	3	N	11	·58	5	D	11	·11	98	6	Jr	9	·64		1	F	8●○	·17	2	Mr	9	·70
4	S	2	·89	6	O	2	·42	7	O	31	·95	2	N	30	·48		4	D	30	·01	99	5	Jr	28●	·54	7	F	27	·07
3	S	21	·78	5	O	21	·31	6	N	19	84	1	D	19○	·38	12	2	Jr	17	·91	00	4	F	16	·44	5	Mr	16	·97
1	S	10	·15	2	O	9	·68	4	N	8	·21	5	D	7○	·74	01	7	Jr	6	·27		1	F	4	·80	3	Mr	6	·33
5	Au	30	·52	7	S	29	·05	1	O	28	·58	3	N	27●○	·11		4	D	26	·64	02	6	Jr	25	·17	7	F	23	·70
4	S	18	·42	5	O	17	·95	7	N	16●	·48	2	D	16	·01	03	3	Jr	14	·54		5	F	13	·07	6	Mr	14	·60
1	S	7	·78	3	O	7○	·31	4	N	5	84	6	D	5	37	04	7	Jr	3	90		2	F	2	·44	3	Mr	2	·97
7	S	25○	·68	2	O	25	·21	3	N	23	·74	5	D	23	27	05	6	Jr	21	·80		1	F	20	·33	2	Mr	21●○	·86
5	S	15○	·05	6	O	14	·58	1	N	13	·11	2	D	12	·64	06	4	Jr	11	·17		5	F	9	70	7	Mr	11●	·23
2	S	4●	·41	3	O	3	·94	5	N	2	·48	7	D	2	·01		1	D	31	54	07	3	Jr	30○	·07	4	F	28●	·60
1	S	23	·31	2	O	22	·84	4	N	21	·37	5	D	20	·90	08	7	Jr	19○	·43		1	F	17	·96	3	Mr	18	·50
5	S	11	·68	6	O	11	·21	1	N	9	·74	3	D	9	·27	09	4	Jr	7○	80		6	F	6	·33	7	Mr	7	·86
3	S	1	·05	4	S	30	·58	6	O	30	·11	7	N	28	·64		2	D	28	·17	10	3	Jr	26	·70	5	F	25	·28
1	S	19	·94	3	O	19	·47	5	N	18○	·00	6	D	17	·54	11	1	Jr	16	·07		2	F	14	·60	4	Mr	16	·13
6	S	9	·31	7	O	8	·84	2	N	7○	·37	3	D	6●	·90	12	5	Jr	5	·43		6	F	3	·96	1	Mr	4	·49
3 5	Au S	28 27	·68 ·21	6	O	26○	·74	1	N	25	·27	2	D	24	·80	13	4	Jr	23	·33		5	F	21	·86	7	Mr	23	·39
2	S	16	·58	4	O	16	·11	5	N	14	·64	7	D	14	·17	14	1	Jr	12	·70		3	F	11	·23	4	Mr	12	76
6	S	5○	·94	1	O	5●	·47	3	N	4	·00	4	D	3	·53	15	6	Jr	2	·06		7	Jr	31	·60	2	Mr	2○	·13
5	S	24	·84	7	O	24	·37	1	N	22	·90	3	D	22	·43	16	4	Jr	20	·96		6	F	19●○	·49	1	Mr	20	·02
3	S	13	·21	4	O	12	·74	6	N	11	·27	7	D	10	·80	17	2	Jr	9	38		3	F	7	·86	5	Mr	9	·39

(1) for Ārya siddhānta + ·02; (2) for Brahma siddhānta —·07; and (3) for Siddhānta Śirōmaṇi —·01.

TABLE II.—

			Commencement of solar year.					Vaiśākha.				Jyeshṭha.				Āshāḍha.				Śrāvaṇa.				Bhādrapada.			
Kaliyuga.	Vikrama.	Śaka era.	Month and day A.D.	Fraction of day.	First new moon in solar year	Anomaly of first new moon.	Christian era.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
							A.D.																				
4318	1274	1139	24M	·8897	14·0818	8·315	**1217**	6	Ap	7	·92	1	My	7	·45	2	Je	5	·98	4	Jl	5	·51	6	Au	4●	·04
4319	1275	1140	25M	·1485	3·1401	4·472	**1218**	4	Mr	28	·29	5 7	Ap My	26 26	82 85	1	Je	24○	·88	3	Jl	24●	·41	4	Au	22	·94
4320	1276	1141	25M	·4072	21·7790	2·605	**1219**	3	Ap	16	·19	4	My	15	72	6	Je	14○	·25	7	Jl	13	·78	2	Au	12	·31
4321	1277	1142	24M	·6660	10·8873	26·317	**1220**	7	Ap	4	·55	2	My	4	·08	3	Je	2●	·61	5	Jl	2	·14	6	Jl	31	·68
4322	1278	1143	24M	·9248	29·5262	24·450	**1221**	4 6	Mr Ap	21 23	·92 ·45	7	My	22●	·98	2	Je	21	·51	4	Jl	21	·04	5	Au	19	·57
4323	1279	1144	25M	·1835	18·6345	20·608	**1222**	3	Ap	12○	·82	5	My	12	·35	6	Je	10	·88	1	Jl	10	·41	2	Au	8	·94
4324	1280	1145	25M	·4123	7·7428	16·765	**1223**	1	Ap	2○	18	2	My	1	·72	4	My	31	·25	5	Je	29	·78	7 1	Jl Au	29 27	·81 ·84
4325	1281	1146	24M	·7010	26·8817	14·898	**1224**	7	Ap	20	·08	1	My	19	·61	3	Je	18	·14	4	Jl	17	·67	6	Au	16	·20
4326	1282	1147	24M	·9598	15·4900	11·055	**1225**	4	Ap	9	·45	5	My	8	98	7	Je	7	·51	2	Jl	7	·04	3	Au	5○	57
4327	1283	1148	25M	·2185	4·5982	7·213	**1226**	1	Mr	29	·82	3	Ap	28	35	4 6	My Je	27 26	·88 ·41	7	Jl	25○	·94	2	Au	24	·47
4328	1284	1149	25M	·4773	23·2371	5·316	**1227**	7	Ap	17	·71	2	My	17	·24	3	Je	15	·78	5	Jl	15●○	31	6	Au	13	·94
4329	1285	1150	24M	7361	12·3454	1·503	**1228**	5	Ap	6	·08	6	My	5	·61	1	Je	4	·14	2	Jl	3●	·67	4	Au	2	·20
4330	1286	1151	24M	·9948	1·4537	25·215	**1229**	2	Mr	26	·45	3 5	Ap My	24 24○	·98 51	7	Je	28	·04	1	Jl	22	·57	3	Au	21	·10
4331	1287	1152	25M	·2536	20·0926	28·348	**1230**	1	Ap	14	·35	2	My	13●○	·88	4	Je	12	·41	5	Jl	11	·94	7	Au	10	·47
4332	1288	1153	25M	·5123	9·2009	19·506	**1231**	5	Ap	3	·71	7	My	3	24	1	Je	1	·77	3	Jl	1	·30	4	Jl	30	·84
4333	1289	1154	24M	·7711	27·8398	17·639	**1232**	4	Ap	21●	·61	6	My	21	·14	7	Je	19	·67	2	Jl	19	·20	3	Au	17	·73
4334	1290	1155	25M	·0298	16·9481	13·786	**1233**	1	Ap	10	98	3	My	10	·51	5	Je	9	·04	6	Jl	8	·57	1	Au	7	·10
4335	1291	1156	25M	·2886	6·0564	9·953	**1234**	6	Mr	31	34	7	Ap	29	.88	2	My	29	·41	3 5	Je Jl	27 27	·94 ·47	7	Au	26●○	·00
4336	1292	1157	25M	·5473	24·6953	8·087	**1235**	5	Ap	19	·24	6	My	18	·77	1	Je	17	·30	2	Jl	16	·83	4	Au	15●	36
4337	1293	1158	24M	·8061	13·8036	4·244	**1236**	2	Ap	7	·61	4	My	7	·14	5	Je	5	·67	7	Jl	5○	·20	1	Au	3●	·73
4338	1294	1159	25M	·0649	2·9119	0·401	**1237**	6	Mr	27	·98	1 3	Ap My	26 26	·51 ·04	4	Je	24○	·57	6	Jl	24	·10	7	Au	22	·63
4339	1295	1160	25M	·3236	21·5508	26·089	**1238**	5	Ap	15	·87	7	My	15	·40	1	Je	13○	·94	3	Jl	13	·47	5	Au	12	·00
4340	1296	1161	25M	·5824	10·6591	22·246	**1239**	3	Ap	5	24	4	My	4	·77	6	Je	3●	·30	7	Jl	2	·83	2	Au	1	·36
4341	1297	1162	24M	·8411	29·2980	20·379	**1240**	7 2	Mr Ap	24 28○	·61 ·14	3	My	22●	·67	5	Je	21	·20	6	Jl	20	·73	1	Au	19	·26
4342	1298	1163	25M	·0999	18·4063	16·537	**1241**	6	Ap	12○	·51	1	My	12	·04	2	Je	10	·57	4	Jl	10	·10	5	Au	8	·63
4343	1299	1164	25M	·3586	7·5146	12·694	**1242**	3	Ap	1	·87	5	My	1	·40	6	My	30	·93	1	Je	29	·46	3 4	Jl Au	29 27	·00 ·53
4344	1300	1165	25M	·6174	26·1534	10·827	**1243**	2	Ap	20	·77	4	My	20	·30	5	Je	18	·83	7	Jl	18	·36	1	Au	16○	·89
4345	1301	1166	24M	·8762	15·2617	6·984	**1244**	7	Ap	9	·14	1	My	8	·67	3	Je	7	·20	4	Jl	6	·73	6	Au	5○	·26
4346	1302	1167	25M	·1349	4·3700	3·143	**1245**	4	Mr	29	50	6	Ap	28	·03	7 2	My Je	27 26	·57 ·10	3	Jl	25●○	·63	5	Au	24	·16
4347	1303	1168	25M	·3937	23·0089	1·275	**1246**	3	Ap	17	·40	4	My	16	·93	6	Je	15	·46	7	Jl	14	·99	2	Au	13	·52
4348	1304	1169	25M	·6524	12·1172	24·987	**1247**	7	Ap	6	·77	2	My	6	·30	3	Je	4○	·83	5	Jl	4●	·36	6	Au	2	·89
4349	1305	1170	24M	9112	1·2255	21·144	**1248**	5	Mr	26	·14	6 1	Ap My	24 24●○	·67 ·20	2	Je	22	·73	4	Jl	22	·26	5	Au	20	·79
4350	1306	1171	25M	·1699	19·8644	19·277	**1249**	4	Ap	14	·03	5	My	13●	·56	7	Je	12	·09	1	Jl	11	·63	3	Au	10	·16
4351	1307	1172	25M	·4287	8·9727	15·434	**1250**	1	Ap	3○	·40	2	My	2●	·93	4	Je	1	·46	5	Je	30	·99	7	Jl	30	·52
4352	1308	1173	25M	·6875	27·6117	13·568	**1251**	7	Ap	22	·30	1	My	21	·83	3	Je	20	·36	4	Jl	19	·89	6	Au	18	·42
4353	1309	1174	24M	·9462	16·7199	9·725	**1252**	4	Ap	10	·67	6	My	10	·20	7	Je	8	·73	2	Jl	8	26	3	Au	6	·79
4354	1310	1175	25M	·2050	5·8282	5·883	**1253**	2	Mr	31	·03	3	Ap	29	·56	5	My	29	·09	6 1	Je Jl	27 27	·62 ·15	2	Au	25	·69
4355	1311	1176	25M	·4637	24·4671	4·015	**1254**	7	Ap	18	·93	2	My	18	·46	3	Je	16	·99	5	Jl	16○	52	7	Au	15	·05
4356	1312	1177	25M	·7225	13·5754	0·173	**1255**	5	Ap	8	·30	6	My	7	·83	1	Je	6	·36	2	Jl	5○	·89	4	Au	4	·42
4357	1313	1178	24M	·9812	2·6837	23·885	**1256**	2	Mr	27	·66	4 5	Ap My	26 25	·19 ·73	7	Je	24●○	·26	1	Jl	23	·79	3	Au	22	·32
4358	1314	1179	25M	·2400	21·3226	22·018	**1257**	1	Ap	15	·56	3	My	15	·09	4	Je	13	·62	6	Jl	13	·15	7	Au	11	·68
4359	1315	1180	25M	·4987	10·4309	18·175	**1258**	5	Ap	4	·93	7	My	4○	·46	1	Je	2●	·99	3	Jl	2	·52	5	Au	1	·05
4360	1316	1181	25M	·7575	29·0698	16·308	**1259**	4	Ap	23○	·83	6	My	23	·36	7	Je	21	·89	2	Jl	21	·42	3	Au	19	·95
4361	1317	1182	25M	·0163	18·1781	12·466	**1260**	2	Ap	12●	·19	3	My	11	·72	5	Je	10	·25	6	Jl	9	·79	1	Au	8	·32
4362	1318	1183	25M	·2750	7·2864	8·623	**1261**	6	Ap	1●	56	1	My	1	·09	2	My	30	·62	4	Je	29	·15	5 7	Jl Au	28 27○	·68 ·21
4363	1319	1184	25M	·5338	29·9252	6·756	**1262**	5	Ap	20	·46	6	My	19	·99	1	Je	18	·52	3	Jl	18	·05	4	Au	16●○	58
4364	1320	1185	25M	·7925	15·0335	2·913	**1263**	2	Ap	9	·83	4	My	9	·36	5	Je	7	·89	7	Jl	7	·42	1	Au	5○	·95
4365	1321	1186	25M	0513	4·1418	26·625	**1264**	7	Mr	29	·19	1	Ap	27	·72	3 4	My Je	27 25	·25 ·78	6	Jl	25	31	7	Au	23	·85
4366	1322	1187	25M	·3100	22·7807	24·758	**1265**	6	Ap	17	·09	7	My	16	·62	2	Je	15○	·15	3	Jl	14	·68	5	Au	13	·21
4367	1323	1188	25M	·5688	11·8890	20·916	**1266**	3	Ap	6	·46	4	My	5	·99	6	Je	4○	·52	1	Jl	4	·05	2	Au	2	·58
4368	1324	1189	25M	·8276	0·9973	17·073	**1267**	7	Mr	26	·82	2 3	Ap My	25 24●○	·35 89	5	Je	23	·42	6	Jl	22	·95	1	Au	21	·48
4369	1325	1190	25M	·0863	19·6362	15·206	**1268**	6	Ap	13○	·72	1	My	13	·25	2	Je	11	·78	4	Jl	11	·31	5	Au	9	·84
4370	1326	1191	25M	·3451	8·7445	11·368	**1269**	4	Ap	3○	·08	5	My	2	·62	7	Je	1	·15	1	Je	30	·68	3	Jl	30	·21
4371	1327	1192	25M	·6038	27·3884	9·497	**1270**	2	Ap	21	·99	4	My	21	·52	6	Je	20	·05	7	Jl	19	·58	2	Au	18	·11

N.B.—For tithis by other siddhāntas, add to the above algebraically as follows :—

Sūrya siddhānta—*cont.*

Āśvina.				Kārttika.				Mārgaśīrsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
7	S	2	·57	2	O	2	·10	3	O	31	·64	5	N	30	·17		6	D	29○	·70	**18**	1	Jr	28●	·23	2	F	26	·76
6	S	21	·47	1	O	21	·00	2	N	19	·53	4	D	19○	·06	**19**	5	Jr	17	·59		7	F	16	·12	1	Mr	17	·68
3	S	10	·84	5	O	10	·37	6	N	8	·90	1	D	8○	·43	**20**	2	Jr	6	·96		4	F	5	·49	6	Mr	6	·02
1	Au	30	·21	2	S	28	·74	4	O	28	·27	5	N	26	·80		7	D	26	·33	**21**	1	Jr	24	·86	3	F	23	·39
7	S	18	·10	1	O	17○	·63	3	N	16	·16	4	D	15	·70	**22**	6	Jr	14	·23		7	F	12	·76	2	Mr	14	·29
4	S	7	·47	6	O	7○	·00	7	N	5	·53	2	D	5	·06	**23**	3	Jr	3	·59		5	F	2	12	6	Mr	3	·65
3	S	26●○	·37	4	O	25	·90	6	N	24	·43	7	D	23	·96	**24**	2	Jr	22	·49		4	F	21	·02	5	Mr	21	·55
7	S	14	·74	2	O	14	·27	3	N	12	·80	5	D	12	·33	**25**	6	Jr	10	·86		1	F	9○	·39	2	Mr	10	·92
5	S	4	·10	6	O	3	·63	1	N	2	·16	2	D	1	·69		4	D	31	·22	**26**	5	Jr	29○	·76	7	F	28●	·29
4	S	23	·00	5	O	22	·53	7	N	21	·06	1	D	20	·59	**27**	3	Jr	19●○	·12		4	F	17	·65	6	Mr	19	·18
1	S	12	·37	2	O	11	·90	4	N	10	·43	5	D	9	96	**28**	7	Jr	8	·49		2	F	7	·02	3	Mr	7	·55
5	Au	31	·73	7	S	30	·26	1	O	29	·80	3	N	28○	33		4	D	27●	·86	**29**	6	Jr	26	·39	7	F	24	·92
4	S	19	·63	6	O	19	·16	7	N	17○	·69	2	D	17	·22	**30**	3	Jr	15	·75		5	F	14	·28	6	Mr	15	·81
2	S	9	·00	3	O	8	·53	5	N	7○	·06	6	D	6	59	**31**	1	Jr	5	·12		2	F	3	·65	4	Mr	5	·18
6 7	Au S	29 27	·37 ·90	2	O	27	·43	3	N	25	·96	5	D	25	49	**32**	7	Jr	24	02		1	F	22	·55	3	Mr	23○	·08
5	S	16○	·26	6	O	15	·79	1	N	14	·32	2	D	13	·86	**33**	4	Jr	12	·39		5	F	10	·92	7	Mr	12○	·45
2	S	5○	·63	4	O	5●	·16	5	N	3	·69	7	D	3	·22	**34**	1	Jr	1	·75		3	Jr	31	·28	4	Mr	1○	·81
1	S	24	·53	3	O	24	·06	4	N	22	·59	6	D	22	12	**35**	7	Jr	20	65		2	F	19●	·18	3	Mr	20	·71
5	S	13	·90	7	O	13	·43	1	N	11	·96	3	D	11	49	**36**	5	Jr	10○	02		6	F	8	·55	1	Mr	9	·08
3	S	2	·26	4	O	1	·79	6	O	31	·32	7	N	29	·85		2	D	29○	·38	**37**	3	Jr	27	92	5	F	26	·45
2	S	21	·16	3	O	20	·69	5	N	19	·22	6	D	18●○	·75	**38**	1	Jr	17	28		2	F	15	·81	4	Mr	17	·34
6	S	10	·53	1	O	10	·06	2	N	8	·59	4	D	8●	·12	**39**	5	Jr	6	65		7	F	5	·18	1	Mr	6	·71
3	Au	30	·89	5	S	29	·42	6	O	28○	·95	1	N	27●	·49		3	D	27	·02	**40**	4	Jr	25	·55	6	F	24	·08
2	S	17	·79	4	O	17○	·32	5	N	15	·85	7	D	15	·38	**41**	1	Jr	13	·91		3	F	12	·44	4	Mr	13	·97
7	S	7	·16	1	O	6●○	·69	3	C	5	·22	4	D	4	·75	**42**	6	Jr	3	·28		7	F	1	·81	2	Mr	3	·34
6	S	26●	06	7	O	25	·59	2	N	24	·12	3	D	23	·65	**43**	5	Jr	22	·18		6	F	20○	·71	1	Mr	22●	·24
3	S	15	·42	4	O	14	·95	6	N	13	·48	1	D	13	·01	**44**	2	Jr	11	·55		4	F	10○	·08	5	Mr	10	·61
7	S	3	·79	2	O	3	·32	3	N	1	85	5	D	1	·38		6	D	30	·91	**45**	1	Jr	29○	·44	2	F	27	·97
6	S	22	·69	1	O	22	·22	2	N	20	·75	4	D	20	·28	**46**	5	Jr	18●	·81		7	F	17	·34	1	Mr	18	·87
4	S	12	·05	5	O	11	·59	7	N	10	·12	1	D	9○	·65	**47**	3	Jr	8	·18		4	F	6	71	6	Mr	8	·24
1	S	1	42	2	S	30	·95	4	O	30	·48	6	N	29○	·01		7	D	28	·54	**48**	2	Jr	27	·07	3	F	25	·61
7	S	19	·32	1	O	18	·85	3	N	17○	·38	4	D	16	·91	**49**	6	Jr	15	·44		7	F	13	·97	2	Mr	15	·50
4	S	8	·69	6	O	8	·22	7	N	6●	·75	2	D	6	·28	**50**	3	Jr	4	81		5	F	3	·34	6	Mr	4	·87
2 3	Au S	29 27○	·05 ·58	5	O	27	·11	6	N	25	·65	1	D	25	·18	**51**	2	Jr	23	·71		4	F	22	·24	5	Mr	23○	·77
7	S	16○	·95	2	O	16	·48	4	N	15	·01	5	D	14	·54	**52**	7	Jr	13	·07		1	F	11	60	3	Mr	12○	·13
5	S	5○	·32	6	O	4	·85	1	N	3	·38	2	D	2	·91	**53**	4	Jr	1	·44		5	Jr	30	·97	7	Mr	1●	·50
4	S	24	·22	5	O	23	·75	7	N	22	·28	1	D	21	·81	**54**	3	Jr	20○	·34		4	F	18	87	6	Mr	20	·40
1	S	13	·58	3	O	13	·11	4	N	11	·64	6	D	11	·17	**55**	7	Jr	9●○	·71		2	F	8	·24	3	Mr	9	·77
5	S	2	·95	7	O	2	·48	2	N	1	·01	3	N	30	·54		5	D	30○	·07	**56**	6	Jr	28	·60	1	F	27	·13
4	S	20	85	6	O	20	·38	7	N	18	·91	2	D	18	·44	**57**	3	Jr	16	·97		5	F	15	·50	7	Mr	17	·03
2	S	10	·21	3	O	9	·75	5	N	8○	·28	6	D	7	·81	**58**	1	Jr	6	·34		2	F	4	·87	4	Mr	6	·40
6	Au	30	·58	1 2	S O	29 28○	·11 ·64	4	N	27	·17	**Pausha Kshaya**					5	D	26	70	**59**	7	Jr	25	·23	1 3	F Mr	23 25	·77 ·30
5	S	18	·48	7	O	18○	·01	1	N	16	·54	3	D	16	·07	**60**	4	Jr	14	·60		6	F	13	·13	7	Mr	13	·66
2	S	6	85	4	O	6●	·38	5	N	4	·91	7	D	4	·44	**61**	1	Jr	2	·97		3	F	1	·50	5	Mr	3○	·03
1	S	25●	·74	3	O	25	·27	4	N	23	·81	6	D	23	·34	**62**	7	Jr	21	·87		2	F	20○	·40	3	Mr	21	·93
6	S	15	·11	7	O	14	·64	2	N	13	·17	3	D	12	·70	**63**	5	Jr	11	·23		6	F	9○	·76	1	Mr	11	·29
3	S	4	·48	5	O	4	·01	6	N	2	·54	1	D	2	·07		2	D	31	·60	**64**	4	Jr	30	13	5	F	28	·66
2	S	22	·38	3	O	21	·91	5	N	20	·44	6	D	19○	·97	**65**	1	Jr	18●	·50		3	F	17	03	4	Mr	18	·56
6	S	11	·74	1	O	11	27	2	N	9	·80	4	D	9○	·33	**66**	5	Jr	7●	·87		7	F	6	·40	1	Mr	7	·93
4	S	1	·11	5	S	30	·64	7	O	30	·17	1	N	28○	·70		3	D	28	·23	**67**	4	Jr	26	·76	6	F	25	·29
3	S	20	·01	4	O	19	·54	6	N	18	·07	7	D	17	·60	**68**	2	Jr	16	·13		3	F	14	·66	5	Mr	15	19
7	S	8	·37	1	O	7○	·91	3	N	6●	·44	4	D	5	·97	**69**	6	Jr	4	·50		1	F	3	·03	2	Mr	4	·56
4 6	Au S	28 27○	·74 ·27	7	O	26	·80	2	N	25	·33	3	D	24	·86	**70**	5	Jr	23	·39		6	F	21	·93	1	Mr	23●○	·46
3	S	16○	·64	5	O	16	·17	6	N	14	·70	1	D	14	·23	**71**	2	Jr	12	·76		4	F	11	·29	5	Mr	12	·82

(1) for Ārya siddhānta +·02; (2) for Brahma siddhānta —·07; (3) for Siddhānta Śirōmaṇi —·01.

TABLE II.—

Kaliyuga.	Vikrama era	Śaka era.	Commencement of solar year. Month and day A.D.	Fraction of day	First new moon in solar year	Anomaly of first new moon.	Christian era	Vaiśākha. Week-day.	Month.	Day.	Fraction.	Jyeshṭha. Week-day.	Month	Day	Fraction.	Āshāḍha. Week-day.	Month.	Day.	Fraction.	Śrāvana. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day	Month.	Day.	Fraction.
							A.D.																				
4372	1328	1193	25M	·8626	16·4917	5·654	**1271**	7	Ap	11	·35	1	My	10	·88	3	Je	9	·41	4	Jl	8	·95	6	Au	7	·48
4373	1329	1194	25M	·1213	5·6000	1·811	**1272**	4	Mr	30	·72	6	Ap	29	·25	7 2	My Je	28 27	·78 ·31	3	Jl	26○	·84	5	Au	25●	·37
4374	1330	1195	25M	·3801	24·2389	27·499	**1273**	3	Ap	18	·62	5	My	18	·15	6	Je	16	68	1	Jl	16○	·21	2	Au	14	·74
4375	1331	1196	25M	·6389	13·3472	23·656	**1274**	7	Ap	7	·99	2	My	7	·52	4	Je	6	·05	5	Jl	5●○	·58	7	Au	4	·11
4376	1332	1197	25M	·8976	2·4555	19·814	**1275**	5	Mr	28	·35	6 1	Ap My	26 26	·88 ·41	2	Je	24●	·94	4	Jl	24	·47	6	Au	23	·01
4377	1333	1198	25M	·1564	21·0944	17·947	**1276**	4	Ap	15	·25	5	My	14○	·78	7	Je	13	·31	1	Jl	12	·84	3	Au	11	37
4378	1334	1199	25M	·4151	10·2027	14·104	**1277**	1	Ap	4	·62	3	My	4○	·15	4	Je	2	68	6	Jl	2	·21	7	Jl	31	·74
4379	1335	1200	25M	6739	28 8416	12 237	**1278**	7	Ap	23	·51	2	My	23	·05	3	Je	21	·58	5	Jl	21	11	6	Au	19	·64
4380	1336	1201	25M	·9336	17·9498	8·395	**1279**	4	Ap	12	88	6	My	12	·41	7	Je	10	94	2	Jl	10	·47	4	Au	9	·00
4381	1337	1202	25M	·1914	7 0581	4·552	**1280**	2	Ap	1●	·25	3	Ap	30	·78	5	My	30	·31	6 1	Je Jl	28 28	84 ·37	2	Au	26○	·90
4382	1338	1203	25M	·4501	25·6970	2·685	**1281**	1	Ap	20	·15	2	My	19	·68	4	Je	18	·21	5	Jl	17	74	7	Au	16○	·27
4383	1339	1204	25M	·7089	14·8053	26·397	**1282**	5	Ap	9	·51	7	My	9	·64	1	Je	7	·57	3	Jl	7	·11	4	Au	5●	·64
4384	1340	1205	25M	·9677	3·9136	22·554	**1283**	2	Mr	29	·88	4	Ap	28	·41	5 7	My Je	27 26○	·94 ·47	2	Jl	26	·00	3	Au	24	·53
4385	1341	1206	25M	·2264	22·5525	20·688	**1284**	1	Ap	16	·78	3	My	16	·31	4	Je	14●○	·84	6	Jl	14	·37	7	Au	12	·90
4386	1342	1207	25M	·4852	11·6608	16·845	**1285**	6	Ap	6	15	7	My	5	·68	2	Je	4○	·21	3	Jl	3	74	5	Au	2	·27
4387	1343	1208	25M	·7439	0·7691	13·002	**1286**	3 5	Mr Ap	26 25○	·51 04	6	My	24	·57	1	Je	23	·10	2	Jl	22	·63	4	Au	21	·17
4388	1344	1209	26M	·0027	19·4080	11·135	**1287**	2	Ap	14○	·41	3	My	13	·94	5	Je	12	·47	7	Jl	12	·00	1	Au	10	·58
4389	1345	1210	25M	·2614	8·5168	7·292	**1288**	6	Ap	2○	·78	1	My	2	·81	2	My	31	·84	4	Je	30	·37	5 7	Jl Au	29 28	·90 ·43
4390	1346	1211	25M	·5202	27 1552	5·426	**1289**	5	Ap	23	·67	7	My	21	·21	1	Je	19	·74	3	Jl	19	·27	4	Au	17	·80
4391	1347	1212	25M	·7790	16·2635	1·583	**1290**	3	Ap	11	04	4	My	10	·57	6	Je	9	·10	7	Jl	8	63	2	Au	7○	·16
4392	1348	1213	26M	·0377	5·3718	25·295	**1291**	7	Mr	31	·41	2	Ap	30	·94	3 5	My Je	29 28	·47 ·00	6	Jl	27○	·53	1	Au	26●	·06
4393	1349	1214	25M	·2965	24·0107	23·428	**1292**	6	Ap	18	·31	7	My	17	·84	2	Je	16	·37	3	Jl	15○	·90	5	Au	14	·43
4394	1350	1215	25M	·5552	13·1190	19·585	**1293**	3	Ap	7	·67	5	My	7	·20	6	Je	5	·78	1	Jl	5●	·27	2	Au	3	·80
4395	1351	1216	25M	·8140	2·2273	15·744	**1294**	1	Mr	28	·04	2 4	Ap My	26 26○	·57 ·10	5	Je	24●	·63	7	Jl	24	·16	1	Au	22	·69
4396	1352	1217	26M	·0727	20·8662	13·876	**1295**	6	Ap	15	·94	1	My	15○	·47	3	Je	14	·00	4	Jl	13	·53	6	Au	12	·06
4397	1353	1218	25M	·3315	9·9745	10·033	**1296**	4	Ap	4	·31	5	My	3○	·84	7	Je	2	·37	1	Jl	1	·90	3	Jl	31	·43
4398	1354	1219	25M	·5902	28·6133	8·166	**1297**	3	Ap	23●	·20	4	My	22	·73	6	Je	21	·26	7	Jl	20	·79	2	Au	19	·33
4399	1355	1220	25M	·8490	17·7216	4·324	**1298**	7	Ap	12	·57	2	My	12	·10	3	Je	10	·63	5	Jl	10	·16	6	Au	8	·69
4400	1356	1221	26M	·1078	6·8299	0 481	**1299**	4	Ap	1	·94	6	My	1	·47	1	My	31	·00	2 4	Je Jl	29 29	·53 ·06	5	Au	27●○	·59
4401	1357	1222	25M	·3665	25·4688	26·169	**1300**	3	Ap	19	·83	5	My	19	·37	6	Je	17	·90	1	Jl	17	·43	2	Au	15●	·96
4402	1358	1223	25M	·6253	14·5771	22·326	**1301**	1	Ap	9	·20	2	My	8	·73	4	Je	7	·26	5	Jl	6○	79	7	Au	5●	·82
4403	1359	1224	25M	·8840	3·6854	18·483	**1302**	5	Mr	29	·57	7	Ap	28	·10	1 3	My Je	27 26●○	·63 ·16	4	Jl	25	·69	6	Au	24	·22
4404	1360	1225	26M	·1428	22·8248	16·616	**1303**	4	Ap	17	·47	6	My	17	·00	7	Je	15●○	53	2	Jl	15	·06	3	Au	13	·59
4405	1361	1226	25M	·4015	11·4326	12·774	**1304**	1	Ap	5	·83	3	My	5○	·36	4	Je	3●	·90	6	Jl	3	·43	7	Au	1	·96
4406	1362	1227	25M	·6603	0·5409	8·981	**1305**	6 7	Mr Ap	26 24○	·20 ·73	2	My	24	·26	3	Je	22	·79	5	Jl	22	·32	6	Au	20	·85
4407	1363	1228	25M	·9191	19 1798	7·064	**1306**	5	Ap	14○	·10	6	My	13	·63	1	Je	12	16	2	Jl	11	·69	4	Au	10	·22
4408	1364	1229	26M	·1778	8·2881	3·221	**1307**	2	Ap	3●	·47	4	My	3	·00	5	Je	1	53	7	Jl	1	·06	1 3	Jl Au	30 29	·59 ·12
4409	1365	1230	25M	·4366	26·9270	1·355	**1308**	1	Ap	21	·86	2	My	20	·89	4	Je	19	·43	5	Jl	18	·96	7	Au	17○	·49
4410	1366	1231	25M	·6953	16·0353	25·067	**1309**	5	Ap	10	·73	7	My	10	·26	1	Je	8	·79	3	Jl	8	·32	4	Au	6○	·85
4411	1367	1232	25M	·9541	5·1436	21·224	**1310**	3	Mr	31	·10	4	Ap	29	·68	6 7	My Je	29 27	·16 ·69	2	Jl	27●○	·22	3	Au	25	·75
4412	1368	1233	26M	·2128	23·7825	19·357	**1311**	2	Ap	19	·00	3	My	18	·58	5	Je	17	·06	6	Jl	16	·59	1	Au	15	·12
4413	1369	1234	25M	·4716	12·8908	15·514	**1312**	6	Ap	7	·86	7	My	6	·89	2	Je	5○	·42	3	Jl	4●	·96	5	Au	3	·49
4414	1370	1235	25M	·7304	1·9991	11·672	**1313**	3	Mr	27	·78	5 6	Ap My	26 25○	·26 ·79	1	Je	24	·32	2	Jl	23	·85	4	Au	22	·38
4415	1371	1236	25M	·9892	20·6380	9·805	**1314**	2	Ap	15	·63	4	My	15●○	·16	5	Je	13	·69	7	Jl	13	·22	1	Au	11	·75
4416	1372	1237	26M	·2479	9·7463	5·962	**1315**	7	Ap	5○	·00	1	My	4●	·53	3	Je	3	·06	4	Jl	2	·59	6	Au	1	·12
4417	1373	1238	25M	·5066	28·3851	4·095	**1316**	5	Ap	22	·89	7	My	22	·42	1	Je	20	·95	3	Jl	20	·48	5	Au	19	·02
4418	1374	1239	25M	·7654	17·4934	0·254	**1317**	3	Ap	12	·26	4	My	11	·79	6	Je	10	·32	7	Jl	9	·85	2	Au	8	·38
4419	1375	1240	26M	·0241	6·6017	28 294	**1318**	7	Ap	1	·63	2	My	1	·16	3	My	30	·69	5 6	Je Jl	29 28	·22 ·75	1	Au	27	·28
4420	1376	1241	26M	·2829	25·2406	22·098	**1319**	6	Ap	20	·53	1	My	20	·06	2	Je	18	·59	4	Jl	18○	·12	5	Au	16●	·65
4421	1377	1242	25M	·5416	14·3489	18·255	**1320**	3	Ap	8	89	5	My	8	·42	6	Je	6	·95	1	Jl	6○	·48	3	Au	5	·01
4422	1378	1243	25M	·8004	3·4572	14 412	**1321**	1	Mr	29	·26	2	Ap	27	·79	4 5	My Je	27 25●○	·82 ·85	7	Jl	25	·38	1	Au	23	·91
4423	1379	1244	26M	·0591	22·0961	12·545	**1322**	7	Ap	17	·16	1	My	16	·69	3	Je	15	·22	4	Jl	14	·75	6	Au	13	·28
4424	1380	1245	26M	·3179	11·2044	8·702	**1323**	4	Ap	6	·52	6	My	6○	·06	7	Je	4	·59	2	Jl	4	·12	3	Au	2	·65
4425	1381	1246	25M	·5767	0·3127	4·860	**1324**	1 3	Mr Ap	25 24●○	·89 ·42	4	My	23	·95	6	Je	22	·48	1	Jl	22	·01	2	Au	20	·54
4426	1382	1247	25M	·8854	18·9516	2·994	**1325**	7	Ap	13	·79	2	My	13	·32	3	Je	11	·85	5	Jl	11	·38	6	Au	9	·91

N.B.—For tithis by other siddhāntas, add to the above algebraically as follows :—

Sūrya siddhānta—cont.

Āśvina				Kārttika				Mārgaśīrsha				Pausha				A.D.	Māgha				A.D.	Phālguna				Chaitra			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
1	S	6●	·01	2	O	5	·54	4	N	4	·07	5	D	3	·60	72	7	Jr	2	·13		1	Jr	31○	·66	3	Mr	1●	·19
6	S	23	·90	1	O	23	·43	2	N	21	·97	4	D	21	·50	73	6	Jr	20○	·03		7	F	18	·56	2	Mr	20	·09
4	S	13	·27	5	O	12	·80	7	N	11	·33	1	D	10	86	74	3	Jr	9○	·89		4	F	7	·92	6	Mr	9	·45
1	S	2	·64	3	O	2	·17	4	O	31	·70	6	N	30	·23		7	D	29	·76	75	2	Jr	28	·29	3	F	26	·82
7	S	21	·54	2	O	21	·07	3	N	19○	60	5	D	19	·13	76	6	Jr	17	·66		1	F	16	19	2	Mr	16	72
4	S	9	·90	6	O	9	·43	7	N	7○	·96	2	D	7	·49	77	4	Jr	6	·03		5	F	4	·56	7	Mr	6	·09
2	An	30	·27	{3	S	28	·80	6	N	26	·86	Pausha Kshaya					1	D	26	·39	78	{2	Jr	24	·92	5	Mr	24	·98
				{5	O	28●○	·33															{4	F	23	·45				
1	S	18	17	2	O	17	·70	4	N	16	·23	5	D	15	·76	79	7	Jr	14	29		1	F	12	·82	3	Mr	14○	·35
5	S	7○	·53	7	O	7	·07	1	N	5	·60	3	D	5	·13	80	4	Jr	3	·66		6	F	2	·19	7	Mr	2○	·72
4	S	25	·43	5	O	24	96	7	N	23	·49	2	D	23	·02	81	3	Jr	21	·55		5	F	20●○	·09	6	Mr	21	·62
1	S	14	·80	3	O	14	·33	4	N	12	·86	6	D	12	39	82	7	Jr	10	·92		2	F	9●	·45	3	Mr	10	·98
6	S	4	·17	7	O	3	·70	2	N	2	·23	3	D	1	·76		5	D	31○	·29	83	6	Jr	29●	82	1	F	28	·35
5	S	23	·06	6	O	22	·59	1	N	21	·13	2	D	20○	·66	84	4	Jr	19	·19		5	F	17	·72	7	Mr	18	·25
2	S	11	·43	3	O	10	·96	5	N	9	49	7	D	9○	·02	85	1	Jr	7	·55		3	F	6	·08	4	Mr	7	·61
6	Au	31	·80	1	S	30	33	2	O	29	·86	4	N	28●	·39		5	D	27	·92	86	7	Jr	26	·45	1	F	24	98
5	S	19	·70	7	O	19○	·23	1	N	17	·76	3	D	17	·29	87	4	Jr	15	·82		6	F	14	·35	7	Mr	15	·88
3	S	9	·06	5	O	8○	·59	6	N	7●	·12	7	D	6	·65	88	2	Jr	5	·19		3	F	3	·72	5	Mr	4	25
1	S	26○	·96	3	O	26	·49	5	N	25	·02	6	D	24	·55	89	1	Jr	23	08		2	F	21	·61	4	Mr	23●	·14
6	S	16●	·33	7	O	15	86	2	N	14	89	3	D	13	·92	90	5	Jr	12	·45		6	F	10○	·98	1	Mr	12	·51
3	S	5●	·69	5	O	5	·23	6	N	3	·76	1	D	3	29	91	2	Jr	1	·82		4	Jr	31○	·35	5	Mr	1	·88
2	S	24	·59	4	O	24	·12	5	N	22	·65	7	D	22	·18	92	1	Jr	20●○	·71		3	F	19	25	4	Mr	19	·78
6	S	12	·96	1	O	12	·49	3	N	11	·02	4	D	10	55	93	6	Jr	9●	08		7	F	7	·61	2	Mr	9	·14
4	S	2	·38	5	O	1	·86	7	O	31	·39	1	N	29○	·92		3	D	29●	·45	94	4	Jr	27	·98	6	F	26	·51
3	S	21	·22	4	O	20	·75	6	N	19○	·29	7	D	18	·82	95	2	Jr	17	35		3	F	15	·88	5	Mr	17	·41
7	S	10	·59	2	O	10	·12	3	N	8○	·65	5	D	8	·18	96	6	Jr	6	·71		1	F	5	·24	2	Mr	5	·77
4	An	29	·96	6	S	28	·49	{1	O	28●	·02	Pausha Kshaya					4	D	26	·08	97	{5	Jr	24	·61	1	Mr	24○	·67
								{2	N	26	·55											{7	F	23	·14				
3	S	17○	·86	5	O	17	·39	6	N	15	·92	1	D	15	·45	98	2	Jr	18	·98		4	F	12	51	6	Mr	14○	·04
1	S	7○	·22	2	O	6	·75	4	N	5	·28	5	D	4	·81	99	7	Jr	8	·35		1	F	1	88	3	Mr	3	41
7	S	26	·12	1	O	25	·65	3	N	24	·18	4	D	23	·71	18	6	Jr	22	·24	00	7	F	20●	·77	2	Mr	21	30
4	S	14	·49	6	O	14	·02	7	N	12	·55	2	D	12	·08	01	3	Jr	10○	·61		5	F	9	·14	6	Mr	10	·67
1	S	3	·85	3	O	3	·39	4	N	1	·92	6	D	1	·45		7	D	30○	98	02	2	Jr	29	·51	4	F	28	·04
7	S	22	·75	2	O	22	28	3	N	20	·81	5	D	20○	·34	03	6	Jr	18	·87		1	F	17	41	2	Mr	18	·94
5	S	12	·12	6	O	11	·65	1	N	10	·18	2	D	9●	·71	04	4	Jr	8	·24		5	F	6	·77	7	Mr	7	·30
2	Au	31	·49	4	S	30	·02	5	O	29○	·55	7	N	28●	·08		1	D	27	·61	05	3	Jr	26	·14	4	F	24	·67
1	S	19	·38	2	O	18○	·92	4	N	17	·45	5	D	16	·98	06	7	Jr	15	51		2	F	14	·04	3	Mr	15	·57
5	S	8	·75	7	O	8○	·28	1	N	6	·81	3	D	6	·34	07	4	Jr	4	·87		6	F	3	·40	7	Mr	4	·94
4	S	27	·65	6	O	27	·18	7	N	25	·71	2	D	25	·24	08	3	Jr	23	·77		5	F	22○	·30	6	Mr	22	·83
2	S	16	·02	3	O	15	·55	5	N	14	·08	6	D	13	·61	09	1	Jr	12	·14		2	F	10○	67	4	Mr	12	20
6	S	5	·38	7	O	4	·91	2	N	3	·44	3	D	2	·98	10	5	Jr	1	·51		7	Jr	31○	04	1	Mr	1	57
5	S	24	·28	6	O	23	·81	1	N	22	·34	2	D	21	·87	11	4	Jr	20	40		5	F	18	·93	7	Mr	20	·47
2	S	13	·65	4	O	13	·18	5	N	11	·71	7	D	11○	·24	12	1	Jr	9	·77		3	F	8	·30	4	Mr	8	·83
7	S	2	·02	1	O	1	55	3	O	31	·08	4	N	29○	·61		6	D	29	·14	13	7	Jr	27	·67	2	F	26	·20
5	S	20	·91	7	O	20	·44	1	N	18○	·98	3	D	18	·51	14	5	Jr	17	·04		6	F	15	·57	1	Mr	17	·10
3	S	10	·28	4	O	9	·81	6	N	8	·34	7	D	7	·87	15	2	Jr	6	·40		3	F	4	93	5	Mr	6	46
7	An	30	·65	{2	S	29○	·18	Margasirā Kshaya				5	N	27	·24		6	D	26	·77	16	{1	Jr	25	·80	4	Mr	24○	·86
				{3	O	28●	·71															{2	F	23	·83				
6	S	17○	·55	1	O	17	·08	2	N	15	·61	4	D	15	14	17	5	Jr	13	·67		7	F	12	·20	1	Mr	13○	·73
3	S	6●○	·91	5	O	6	·44	6	N	4	·97	1	D	4	·50	18	3	Jr	3	·04		4	F	1	·57	6	Mr	3	·10
2	S	25●	·61	4	O	25	·34	5	N	23	·87	7	D	23	·40	19	1	Jr	21○	·93		3	F	20●	·46	5	Mr	22	·63
7	S	15	·18	1	O	14	·71	3	N	13	·24	4	D	12	·77	20	6	Jr	11○	·30		7	F	9●	·83	2	Mr	10	·36
4	S	3	·55	6	O	3	·08	7	N	1	·61	2	D	1	·14		3	D	30○	·67	21	5	Jr	29	·20	6	F	27	·73
3	S	22	·44	4	O	21	·97	6	N	20	·50	1	D	20	·04	22	2	Jr	18	·57		4	F	17	·10	5	Mr	18	·63
7	S	11	·81	2	O	11	34	3	N	9	·87	5	D	9●	·40	23	6	Jr	7	·93		1	F	6	·46	2	Mr	7	·99
5	S	1	·18	6	S	30	·71	1	O	30○	·24	2	N	28	·77		4	D	28	·30	24	5	Jr	26	·83	7	F	25	·36
4	S	19	·08	5	O	18○	·61	7	N	17	·14	1	D	16	·67	25	3	Jr	15	·20		4	F	13	·73	6	Mr	15	·26
1	S	8	·44	3	O	7●	97	4	N	6	·50	6	D	6	·03	26	7	Jr	4	56		2	F	3	·10	3	Mr	4○	·63

(1) for Ārya siddhānta + ·02; (2) for Brahma siddhānta − ·07; and (3) for Siddhānta Śiromaṇi — ·01.

TABLE II.—

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era.	Vaiśākha.				Jyeshṭha.				Āshāḍha.				Śrāvaṇa.				Bhādrapada			
							A.D.	Week-day.	Month.	Day.	Fraction.	Week day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
4427	1383	1248	26M	·0942	8·0599	26·705	**1326**	5	Ap	3●	·16	6	My	2	·69	1	Je	1	·22	2	Je	30	·75	4 5	Jl Au	30 28○	·28 ·81
4428	1384	1249	26M	·3528	26·6988	24·838	**1327**	4	Ap	22	·05	5	My	21	·59	7	Je	20	·12	1	Jl	19	·65	3	Au	18○	·18
4429	1385	1250	25M	·6117	15·8071	20·995	**1328**	1	Ap	10	·42	2	My	9	·95	4	Je	8	·48	6	Jl	8	·01	7	Au	6●○	·54
4430	1386	1251	25M	·8705	4·9154	17·153	**1329**	5	Mr	30	·79	7	Ap	29	·32	1 3	My Je	28 27	·85 ·38	4	Jl	26●	·91	6	Au	25	·44
4431	1387	1252	26M	·1292	23·5543	15·286	**1330**	4	Ap	18	·69	6	My	18	·22	7	Je	16○	·75	2	Jl	16	·28	3	Au	14	·81
4432	1388	1253	26M	·3880	12·6626	11·443	**1331**	2	Ap	8	·05	3	My	7	·58	5	Je	6○	·11	6	Jl	5	·65	1	Au	4	·18
4433	1389	1254	25M	·6467	1·7709	7·600	**1332**	6	Mr	27	·42	7 2	Ap My	25 25●○	·95 48	4	Je	24	·01	5	Jl	23	54	7	Au	22	07
4434	1390	1255	25M	·9055	20·4097	5·734	**1333**	5	Ap	15○	·32	6	My	14	·85	1	Je	13	·38	2	Jl	12	·91	4	Au	11	·44
4435	1391	1256	26M	·1642	9·5180	1·891	**1334**	2	Ap	4○	·69	4	My	4●	·22	5	Je	2	·75	7	Jl	2	·28	1	Jl	31	·81
4436	1392	1257	26M	·4230	28·1569	0·024	**1335**	1	Ap	23	·58	3	My	23	·11	4	Je	21	·64	6	Jl	21	·18	7	Au	19	·71
4437	1393	1258	25M	·6818	17·2652	23·736	**1336**	5	Ap	11	·95	7	My	11	·48	2	Je	10	·01	3	Jl	9	·54	5	Au	8	·07
4438	1394	1259	25M	·9405	6·3735	19·893	**1337**	3	Ap	1	·32	4	Ap	30	·85	6	My	30	·38	7 2	Je Jl	28 28○	·91 ·44	3	Au	26	·97
4439	1395	1260	26M	·1993	25·0124	18·027	**1338**	2	Ap	20	·22	3	My	19	75	5	Je	18	·28	6	Jl	17○	·81	1	Au	16	34
4440	1396	1261	26M	·4580	14·1207	14·184	**1339**	6	Ap	9	·58	1	My	9	·11	2	Je	7	·64	4	Jl	7●○	17	5	Au	5	·71
4441	1397	1262	25M	·7168	3·2290	10·341	**1340**	3	Mr	28	·95	5	Ap	27	·48	7 1	My Je	27 25	·01 ·54	3	Jl	25	·07	4	Au	23	·60
4442	1398	1263	25M	·9755	21·8679	8·474	**1341**	2	Ap	16	·85	4	My	16○	·38	5	Je	14	·91	7	Jl	14	·44	1	Au	12	·97
4443	1399	1264	26M	·2343	10·9762	4·632	**1342**	7	Ap	6	·21	1	My	5●○	·75	3	Je	4	·28	4	Jl	3	·81	6	Au	2	·34
4444	1400	1265	26M	·4930	0·0845	0·789	**1343**	4 6	Mr Ap	26 25●	·58 ·11	7	My	24	·64	2	Je	23	·17	3	Jl	22	·70	5	Au	21	·23
4445	1401	1266	25M	·7518	18·7234	26·477	**1344**	3	Ap	13	·48	5	My	13	·01	6	Je	11	·54	1	Jl	11	·07	2	Au	9	·60
4446	1402	1267	26M	·0106	7·8317	22·634	**1345**	7	Ap	2	84	2	My	2	·38	3	My	31	·91	5	Je	30	·44	6 1	Jl Au	29 28○	·97 ·50
4447	1403	1268	26M	·2693	26·4706	20·767	**1346**	6	Ap	21	·74	1	My	21	·28	2	Je	19	·81	4	Jl	19	·34	5	Au	17○	·87
4448	1404	1269	26M	·5281	15·5789	16·924	**1347**	4	Ap	11	·11	5	My	10	·64	7	Je	9	·17	1	Jl	8	·70	3	Au	7●	·23
4449	1405	1270	25M	·7868	4·6872	13·082	**1348**	1	Mr	30	·48	3	Ap	29	·01	4 6	My Je	28 27○	·54 ·07	7	Jl	26●	·60	2	Au	25	·13
4450	1406	1271	26M	·0456	23·3261	11·215	**1349**	7	Ap	18	·38	1	My	17	·91	3	Je	16○	·44	4	Jl	15	·97	6	Au	14	·50
4451	1407	1272	26M	·3043	12·4344	7·372	**1350**	4	Ap	7	74	6	My	7	·27	7	Je	5○	·81	2	Jl	5	·34	3	Au	3	·87
4452	1408	1273	26M	5631	1·5427	3·529	**1351**	2 3	Mr Ap	28 26	·11 ·64	5	My	26	·17	3	Je	24	70	1	Jl	24	23	2	Au	22	76
4453	1409	1274	25M	8219	20·1815	1·663	**1352**	1	Ap	15○	·01	2	My	14	·54	4	Je	13	·07	5	Jl	12	·60	7	Au	11	13
4454	1410	1275	26M	·0806	9·2898	25·375	**1353**	5	Ap	4○	·38	6	My	3	·91	1	Je	2	44	2	Jl	1	97	4 6	Jl Au	31 30	·50 ·03
4455	1411	1276	26M	·3394	27·9287	23·508	**1354**	4	Ap	23	27	5	My	22	80	7	Je	21	·33	1	Jl	20	·87	3	Au	19	·40
4456	1412	1277	26M	·5981	17·0370	19·665	**1355**	1	Ap	12	·64	3	My	12	·17	4	Je	10	·70	6	Jl	10	·23	7	Au	8○	·76
4457	1413	1278	25M	·8568	6·1453	15·823	**1356**	6	Ap	1	01	7	Ap	30	·54	2	My	30	·07	3 5	Je Jl	28 28○	·60 13	6	Au	26	·66
4458	1414	1279	26M	·1156	24·7842	13·956	**1357**	4	Ap	19	91	6	My	19	·44	7	Je	17	·97	2	Jl	17○	·50	4	Au	16	·03
4459	1415	1280	26M	·3744	13·8925	10·113	**1358**	2	Ap	9	27	3	My	8	·80	5	Je	7	·33	6	Jl	6●	86	1	Au	5	·39
4460	1416	1281	26M	6331	3·0008	6·270	**1359**	6	Mr	29	64	1 2	Ap My	28 27○	17 70	4	Je	26●	23	5	Jl	25	·76	7	Au	24	·29
4461	1417	1282	25M	·8919	21·6397	4·403	**1360**	5	Ap	16	54	7	My	16○	07	1	Je	14	·60	3	Jl	14	13	4	Au	12	·66
4462	1418	1283	26M	·1507	10·7480	0·561	**1361**	2	Ap	5	90	4	My	5●	43	5	Je	3	·97	7	Jl	3	50	2	Au	2	03
4463	1419	1284	26M	4094	29·3869	26·248	**1362**	7 1	Mr Ap	26 24●	27 80	3	My	24	33	4	Je	22	86	6	Jl	22	39	7	Au	20	·92
4464	1420	1285	26M	·6682	18·4952	22·406	**1363**	6	Ap	14	·17	7	My	13	·70	2	Je	12	·23	3	Jl	11	76	5	Au	10	·29
4465	1421	1286	25M	·9269	7·6035	18·563	**1364**	3	Ap	2	·54	5	My	2	·07	6	My	31	60	1	Jl	30	·13	2 4	Jl Au	29 28○	·66 ·19
4466	1422	1287	26M	1857	26·2424	16·696	**1365**	2	Ap	21	43	3	My	20	·96	5	Je	19	·49	7	Jl	19	03	1	Au	17	·56
4467	1423	1288	26M	·4444	15·3507	12·853	**1366**	6	Ap	10	80	1	My	10	33	2	Je	8	·86	4	Jl	8○	·39	5	Au	6●	·92
4468	1424	1289	26M	7032	4·4590	9·011	**1367**	4	Mr	31	17	5	Ap	29	·70	7 1	My Je	29 27○	23 ·76	3	Jl	27●	·29	4	Au	25	·82
4469	1425	1290	25M	·9620	23·0979	7·144	**1368**	3	Ap	18	07	4	My	17	60	6	Je	16○	·13	7	Jl	15	·66	2	Au	14	·19
4470	1426	1291	26M	·2207	12·2062	3·301	**1369**	7	Ap	7	·43	1	My	6	·96	3	Je	5●	·49	5	Jl	5	02	6	Au	3	·55
4471	1427	1292	26M	4795	1·3144	27·018	**1370**	4 6	Mr Ap	27 26○	80 ·33	7	My	25	86	2	Je	24	·39	3	Jl	23	·92	5	Au	22	·45
4472	1428	1293	26M	·7382	19·9533	25·146	**1371**	3	Ap	15○	·70	5	My	15	23	6	Je	13	76	1	Jl	13	·29	2	Au	11	·82
4473	1429	1294	25M	·9970	9·0616	21·304	**1372**	1	Ap	4	·06	2	My	3	·59	4	Je	2	·13	5	Jl	1	·66	7 1	Jl Au	31 29	19 ·72
4474	1430	1295	26M	·2557	27·7005	19·437	**1373**	6	Ap	22	·96	1	My	22	·49	3	Je	21	·02	4	Jl	20	55	6	Au	19	·08
4475	1431	1296	26M	·5145	16·8088	15·594	**1374**	4	Ap	12	33	5	My	11	·86	7	Je	10	·39	1	Jl	9	·92	3	Au	8○	·45
4476	1432	1297	26M	7733	5·9171	11·751	**1375**	1	Ap	1	·70	3	My	1	·23	4	My	30	·76	6 7	Je Jl	29 28●○	·29 ·82	2	Au	27	·35
4477	1433	1298	26M	·0323	24·5560	9·885	**1376**	7	Ap	19	·59	2	My	19	12	3	Je	17	·65	5	Jl	17●	·19	6	Au	15	·72
4478	1434	1299	26M	·2908	13·6643	6·042	**1377**	4	Ap	8	·96	6	My	8	·49	1	Je	7○	·02	2	Jl	6●	·55	4	Au	5	·08
4479	1435	1300	26M	·5495	2·7726	2·199	**1378**	2	Mr	29	·33	3 5	Ap My	27 27●○	·86 ·39	6	Je	25	·92	1	Jl	25	·45	2	Au	23	·98

N.B.—For tithis by other siddhāntas, add to the above algebraically as follows:—

Sūrya siddhānta—*cont.*

Āśvina.				Kārttika.				Mārgaśīrsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction	Week-day.	Month	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
7	S	27	·84	1	O	26	·87	3	N	25	·40	4	D	24	·93	**27**	6	Jr	23	·46		1	F	22○	·99	2	Mr	23	·52
4	S	16	·71	6	O	16	·24	7	N	14	·77	2	D	14	·30	**28**	3	Jr	12	·83		5	F	11○	·36	6	Mr	11	·89
2	S	5	·07	3	O	4	61	5	N	3	·14	6	D	2	·67	**29**	1	Jr	1	·20		2	Jr	30	·73	4	Mr	1	·26
7	S	28	·97	2	O	23	·50	4	N	22	·03	5	D	21○	·56	**30**	7	Jr	20	·09		1	F	18	·63	3	Mr	20	·16
5	S	13	·34	6	O	12	·87	1	N	11	·40	2	D	10○	·93	**31**	4	Jr	9	·46		5	F	7	·99	7	Mr	9	·52
2	S	2	·71	4	O	2	·24	5	O	31	·77	7	N	30●○	·30		1	D	29	·83	**32**	3	Jr	28	·36	4	F	26	·89
1	S	20	60	3	O	20	·14	4	N	18	·67	6	D	18	·20	**33**	7	Jr	16	·73		2	F	15	·26	3	Mr	16	·79
5	S	9	·97	7	O	9○	·50	2	N	8	·03	3	D	7	·56	**34**	5	Jr	6	·09		6	F	4	·62	1	Mr	6	·16
{ 3	Au	30	34	6	O	28	·40	7	N	26	·93	**Pausha Kshaya**					2	D	26	·46	**35** {	3	Jr	24	·99	7	Mr	25●○	·05
{ 4	S	28○	·87																			5	F	23	·52				
2	S	18○	·24	3	O	17	·77	5	N	16	·30	6	D	15	·83	**36**	1	Jr	14	·36		2	F	12	·89	4	Mr	13	·42
6	S	6●	·60	1	O	6	·13	2	N	4	·66	4	D	4	·20	**37**	5	Jr	2	·73		7	F	1○	·26	1	Mr	2●	·79
5	S	25	·50	7	O	25	·03	1	N	23	·56	3	D	28	·09	**38**	4	Jr	21○	·62		6	F	20	·15	7	Mr	21	·68
2	S	14	·87	4	O	14	·40	5	N	12	·93	7	D	12	·46	**39**	1	Jr	10○	·99		3	F	9	·52	5	Mr	11	05
7	S	4	24	1	O	3	·77	3	N	2	·30	4	D	1	·83		6	D	31●	·36	**40**	7	Jr	29	·89	2	F	28	·42
6	S	22	·13	7	O	21	66	2	N	20	·19	3	D	19	·73	**41**	5	Jr	18	·26		6	F	16	·79	1	Mr	18	·32
3	S	11	·50	5	O	11	·03	6	N	9○	·56	7	D	9●	·09	**42**	2	Jr	7	62		4	F	6	·15	5	Mr	7	·68
7	Au	31	·87	2	S	30	40	3	O	29○	·93	5	N	28	·46		6	D	27	·99	**43**	1	Jr	26	·52	3	F	25	·05
6	S	19	·77	1	O	19●	·30	2	N	17	·83	4	D	17	·36	**44**	5	Jr	15	·89		7	F	14	·42	1	Mr	14	·95
4	S	8○	·13	5	O	7●	·60	7	N	6	·19	1	D	5	·72	**45**	3	Jr	4	26		4	F	2	·79	6	Mr	4○	·32
3	S	27●	·03	4	O	26	·56	6	N	25	·09	7	D	24	·62	**46**	2	Jr	23	·15		3	F	21●○	68	5	Mr	23	·21
7	S	16	·40	1	O	15	·93	3	N	14	·46	4	D	13	·99	**47**	6	Jr	12	·52		1	F	11●	·05	2	Mr	12	·58
4	S	5	76	6	O	5	·30	7	N	3	·83	2	D	3	·36	**48**	3	Jr	1○	89		5	Jr	31	·42	6	F	29	·95
3	S	23	·66	5	O	23	·19	6	N	21	·72	1	D	21○	·25	**49**	2	Jr	19	·79		4	F	18	·32	5	Mr	19	·85
1	S	13	·03	2	O	12	·56	4	N	11	·09	5	D	10○	·62	**50**	7	Jr	9	·15		1	F	7	·68	3	Mr	9	·21
5	S	2	40	6	O	1	·93	1	O	31	·46	2	N	29●	·99		4	D	29	52	**51**	6	Jr	28	05	7	F	26	·58
4	S	21	·29	5	O	20○	·83	7	N	19	·36	1	D	18	·89	**52**	3	Jr	17	·42		4	F	15	·95	6	Mr	16	·48
1	S	9	·66	3	O	9○	·19	4	N	7	·72	6	D	7	·25	**53**	7	Jr	5	·78		2	F	4	·31	3	Mr	5	·85
7	S	28○	·56	2	O	28	·09	3	N	26	·62	5	D	26	·15	**54**	6	Jr	24	68		1	F	23	·21	2	Mr	24●	·74
4	S	17●	93	6	O	17	·46	7	N	15	·99	2	D	15	·52	**55**	4	Jr	14	·05		5	F	12○	·58	7	Mr	14	·11
2	S	7●	29	3	O	6	·82	5	N	5	·35	6	D	4	·89	**56**	1	Jr	3	·42		2	F	1○	·95	4	Mr	2	·48
1	S	25	·19	2	O	24	·72	4	N	23	·25	5	D	22	·78	**57**	7	Jr	21○	·31		1	F	19	·84	3	Mr	21	·37
5	S	14	·56	7	O	14	·09	1	N	12	62	3	D	12	·15	**58**	4	Jr	10●	·68		6	F	9	·21	7	Mr	10	·74
2	S	3	·93	4	O	3	·46	5	N	1	·99	7	D	1	52		2	D	31●	·05	**59**	3	Jr	29	·58	5	F	28	·11
1	S	22	·83	3	O	22	·35	4	N	20○	·88	6	D	20	·41	**60**	7	Jr	18	·95		2	F	17	·48	4	Mr	18	·01
6	S	11	·19	7	O	10	·72	2	N	9○	·25	3	D	8	78	**61**	5	Jr	7	·31		6	F	5	·84	1	Mr	7	·87
3	Au	31	·56	5	S	30	·09	6	O	29	62	1	N	28	·15		2	D	27	·68	**62**	4	Jr	26	·21	5	F	24	·74
2	S	19○	·45	3	O	18	·99	5	N	17	·52	7	D	17	·05	**63**	1	Jr	15	·58		3	F	14	·11	4	Mr	15○	·64
6	S	8○	·82	1	O	8	·35	2	N	6	·88	4	D	6	·41	**64**	5	Jr	4	·94		7	F	3	·47	2	Mr	4●○	·01
5	S	26	·72	7	O	26	·25	1	N	24	·78	3	D	24	·31	**65**	4	Jr	22	·84		6	F	21●	·37	7	Mr	22	·90
3	S	16	·09	4	O	15	·62	6	N	14	·15	7	D	13	·68	**66**	2	Jr	12○	·21		3	F	10	·74	5	Mr	12	·27
7	S	5	·45	1	O	4	·98	3	N	3	·51	5	D	3	·05	**67**	6	Jr	1○	·58		1	Jr	31	·11	2	Mr	1	·64
6	S	24	·35	7	O	23	·88	2	N	22	·41	3	D	21●○	·94	**68**	5	Jr	20	·47		7	F	19	·00	1	Mr	19	·53
3	S	12	·72	5	O	12	25	6	N	10	·78	1	D	10	·31	**69**	2	Jr	8	84		4	F	7	·37	5	Mr	8	·90
1	S	2	·09	2	O	1	·62	4	O	31○	·15	5	N	29●	·68		7	D	29	·21	**70**	1	Jr	27	·74	3	F	26	·27
6	S	20	·98	1	O	20○	·51	3	N	19	·04	4	D	18	·57	**71**	6	Jr	17	·11		7	F	15	·64	2	Mr	17	·17
4	S	10	·35	5	O	9●○	·88	7	N	8	·41	1	D	7	·94	**72**	3	Jr	6	·47		5	F	5	·00	6	Mr	5	·53
3	S	28	·25	4	O	27	·78	6	N	26	·31	7	D	25	·84	**73**	2	Jr	24	·37		3	F	22○	·90	5	Mr	24●	·43
7	S	17●	·61	2	O	17	·15	3	N	15	·68	5	D	15	·21	**74**	6	Jr	13	·74		1	F	12○	·27	2	Mr	13●	·80
4	S	6	·98	6	O	6	·51	1	N	5	·04	2	D	3	·57	**75**	4	Jr	3	·10		5	F	1●○	63	7	Mr	3	·17
3	S	25	·88	5	O	25	·41	6	N	23	·94	1	D	23	·47	**76**	3	Jr	22	·00		4	F	20	·53	6	Mr	21	·06
1	S	14	·25	2	O	13	·78	4	N	12	·31	5	D	11	·84	**77**	7	Jr	10●	·37		1	F	8	·90	3	Mr	10	·43
5	S	3	·61	7	O	3	·14	1	N	1	·67	3	D	1○	·21		4	D	30●	·74	**78**	6	Jr	29	·27	7	F	27	·80
4	S	22	·51	6	O	22	·04	7	N	20○	·57	2	D	20	·10	**79**	3	Jr	18	·63		5	F	17	·16	6	Mr	18	·69

(1) for Sūrya siddhānta + ·03; (2) for Brahma siddhānta —·08; and (3) for Siddhānta Śirōmaṇi —·02.

TABLE II.—

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era.	Vaiśākha.				Jyeshtha.				Āshāḍha.				Śrāvaṇa.				Bhādrapada.			
								Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
							A.D.																				
4480	1436	1301	26M	·8038	21·4115	0·332	**1379**	1	Ap	17	23	2	My	16○	·76	4	Je	15	·29	5	Jl	14	·82	7	Au	13	·85
4481	1437	1302	26M	·0670	10·5198	24·044	**1380**	5	Ap	5	59	7	My	5●	12	1	Je	3	·65	3	Jl	3	·18	4	Au	1	·71
4482	1438	1303	26M	·3258	29·1587	22·177	**1381**	2 4	Mr Ap	25○ 24	96 ·49	6	My	24	·02	7	Je	22	·55	2	Jl	22	·08	3	Au	20	·61
4483	1439	1304	26M	·5845	18·2670	18·835	**1382**	1	Ap	13	·86	3	My	13	·39	4	Je	11	·92	6	Jl	11	·45	7	Au	9	·98
4484	1440	1305	26M	8433	7·3753	14·492	**1383**	6	Ap	3	22	7	My	2	·75	2	Je	1	·29	3	Je	30	82	5 6	Jl Au	30 28●	35 ·88
4485	1441	1306	26M	·1021	26·0142	12·625	**1384**	5	Ap	21	·12	6	My	20	65	1	Je	19	·18	2	Jl	18○	·71	4	Au	17●	24
4486	1442	1307	26M	·8608	15·1225	8·782	**1385**	2	Ap	10	49	4	My	10	·02	5	Je	8	·55	7	Jl	8○	·08	1	Au	6	·61
4487	1443	1308	26M	·6196	4·2808	4·940	**1386**	6	Mr	30	86	1	Ap	29	·39	2 4	My Je	28 27●○	·92 ·45	5	Jl	26	·98	7	Au	25	·51
4488	1444	1309	26M	·8783	22·8696	3·078	**1387**	5	Ap	18	75	7	My	18	28	1	Je	16●	·81	3	Jl	16	·35	4	Au	14	·88
4489	1445	1310	26M	·1871	11·9779	26·785	**1388**	3	Ap	7	·12	4	My	6○	·65	6	Je	5●	·18	7	Jl	4	·71	2	Au	3	24
4490	1446	1311	26M	3958	1·0862	22·942	**1389**	7	Mr	27	49	2 3	Ap My	26●○ 25	·02 ·55	5	Je	24	.08	6	Jl	23	61	1	Au	22	·14
4491	1447	1312	26M	·6546	19·7251	21·075	**1390**	6	Ap	15○	39	7	My	14	·92	2	Je	13	·45	3	Jl	12	·98	5	Au	11	·51
4492	1448	1313	26M	·9134	8·8334	17·232	**1391**	3	Ap	4●	·75	5	My	4	·28	6	Je	2	·81	1	Jl	2	34	2 4	Jl Au	31 30	·87 ·41
4493	1449	1314	26M	·1721	27·4723	15·366	**1392**	2	Ap	22	·65	4	My	22	·18	5	Je	20	·71	7	Jl	20	24	1	Au	18○	·77
4494	1450	1315	26M	·4309	16·5806	11·523	**1393**	7	Ap	12	02	1	My	11	·55	3	Je	10	·08	4	Jl	9	61	6	Au	8●○	·14
4495	1451	1316	26M	6896	5·6889	7·680	**1394**	4	Ap	1	·38	6	My	1	·91	7	My	30	·45	1 3	Je Jl	28 28	98 ·51	5	Au	27	04
4496	1452	1317	26M	9484	24·3278	5·813	**1395**	3	Ap	20	28	4	My	19	·81	6	Je	18○	·34	7	Jl	17	87	2	Au	16	·40
4497	1453	1318	26M	·2071	13·4361	1·970	**1396**	7	Ap	8	65	2	My	8	18	3	Je	6○	71	5	Jl	6	24	6	Au	4	·77
4498	1454	1319	26M	4659	2·5444	25·683	**1397**	5	Mr	29	02	6 1	Ap My	27 27●○	·55 ·08	2	Je	25	61	4	Jl	25	14	5	Au	23	67
4499	1455	1320	26M	7247	21·1833	23·816	**1398**	3	Ap	16	91	5	My	16	·44	6	Je	14	·97	1	Jl	14	·51	3	Au	13	·04
4500	1456	1321	26M	9834	10·2916	19·973	**1399**	1	Ap	6○	·28	2	My	5	81	4	Je	4	·34	5	Jl	3	87	7	Au	2	·40
4501	1457	1322	26M	·2422	28·9805	18·106	**1400**	7	Ap	24	·18	1	My	23	.71	3	Je	22	·24	4	Jl	21	77	6	Au	20	·30
4502	1458	1323	26M	·5009	18·0388	14·264	**1401**	4	Ap	13	·55	6	My	13	.08	7	Je	11	61	2	Jl	11	14	3	Au	9	67
4503	1459	1324	26M	·7597	7·1471	10·421	**1402**	1	Ap	2	·91	3	My	2	.44	4	My	31	97	6	Je	30	·50	1 2	Jl Au	30○ 28	03 ·57
4504	1460	1325	27M	·0184	25·7860	8·554	**1403**	7	Ap	21	81	2	My	21	·34	3	Je	19	·87	5	Jl	19○	·40	6	Au	17	·93
4505	1461	1326	26M	·2772	14·8943	4·711	**1404**	5	Ap	10	·18	6	My	9	·71	1	Je	8	·24	2	Jl	7○	·77	4	Au	6	30
4506	1462	1327	26M	·5360	4·0026	0·869	**1405**	2	Mr	30	·54		Ap	29	·07	5 7	My Je	28 27	61 ·14	1	Jl	26	·67	3	Au	25	·20
4507	1463	1328	26M	·7947	22·6414	26·556	**1406**	1	Ap	18	·44	2	My	17○	·97	4	Je	16●	·50	6	Jl	16	·03	7	Au	14	·56
4508	1464	1329	27M	·0535	11·7497	22·714	**1407**	5	Ap	7	81	7	My	7○	·34	1	Je	5●	87	3	Jl	5	·40	4	Au	3	·93
4509	1465	1330	26M	·3122	0·8580	18·871	**1408**	3 4	Mr Ap	27 25●○	18 ·71	6	My	25	·24	7	Je	23	·77	2	Jl	23	·30	3	Au	21	83
4510	1466	1331	26M	5710	19·4969	17·004	**1409**	2	Ap	15	·07	3	My	14	·60	5	Je	13	·13	6	Jl	12	·67	1	Au	11	20
4511	1467	1332	26M	·8297	8·6052	13·161	**1410**	6	Ap	4	·44	7	My	3	·97	2	Je	2	50	4	Jl	2	03	5 7	Jl Au	31 30○	·56 ·09
4512	1468	1333	27M	·0885	27·2441	11·295	**1411**	5	Ap	23	84	6	My	22	·87	1	Je	21	·40	2	Jl	20	·93	4	Au	19○	·46
4513	1469	1334	26M	·3472	16·3524	7·453	**1412**	2	Ap	11	·71	4	My	11	24	5	Je	9	77	7	Jl	9	30	1	Au	7	·83
4514	1470	1335	26M	·6060	5·4607	3·609	**1413**	7	Ap	1	·07	1	Ap	30	·60	3 4	My Je	30 28○	13 ·66	6	Jl	28	·19	7	Au	26	·72
4515	1471	1336	26M	·8648	24·0996	1·742	**1414**	5	Ap	19	·97	7	My	19	·50	2	Je	18○	·03	3	Jl	17	56	5	Au	16	·09
4516	1472	1337	27M	·1235	13·2079	25·454	**1415**	3	Ap	9	·34	4	My	8	·87	6	Je	7●○	·40	7	Jl	6	·93	2	Au	5	·46
4517	1473	1338	26M	3823	2·3162	21·612	**1416**	7	Mr	28	·70	2 3	Ap My	27 26●	·23 ·77	5	Je	25	30	6	Jl	24	·83	1	Au	23	36
4518	1474	1339	26M	6410	20·9551	19·745	**1417**	6	Ap	16○	·60	1	My	16	·13	2	Je	14	·66	4	Jl	14	19	5	Au	12	·72
4519	1475	1340	26M	·8998	10·0634	15·902	**1418**	3	Ap	5○	·97	5	My	5	·50	7	Je	4	·03	1	Jl	3	·56	3	Au	2	·09
4520	1476	1341	27M	1585	28·7028	14·035	**1419**	2	Ap	24	·87	4	My	24	·40	5	Je	22	·93	7	Jl	22	·46	1	Au	20	·99
4521	1477	1342	26M	·4173	17·8106	10·193	**1420**	7	Ap	13	·23	1	My	12	·76	3	Je	11	·29	4	Jl	10	·83	6	Au	9○	·36
4522	1478	1343	26M	·6761	6·9189	6·850	**1421**	4	Ap	2	·60	6	My	2	13	7	My	31	·66	2 3	Je Jl	30 29○	·19 ·72	5	Au	28●	25
4523	1479	1344	26M	·9348	25·5578	4·488	**1422**	3	Ap	21	·50	5	My	21	·03	6	Je	19	·56	1	Jl	19○	·09	2	Au	17	62
4524	1480	1345	27M	1936	14·6660	0·640	**1423**	7	Ap	10	·87	2	My	10	·40	3	Je	8	·93	5	Jl	8●	·46	6	Au	6	·99
4525	1481	1346	26M	·4523	3·7743	24·352	**1424**	5	Mr	30	·23	6	Ap	28	76	1 2	My Je	28○ 26	·29 ·82	4	Jl	26	85	5	Au	24	·89
4526	1482	1347	26M	·7111	22·4132	22·485	**1425**	4	Ap	18	·18	5	My	17○	·66	7	Je	16	·19	1	Jl	15	·72	3	Au	14	·25
4527	1483	1348	26M	9698	11·5215	18·644	**1426**	1	Ap	7	·50	3	My	7○	·03	4	Je	5	·56	6	Jl	5	·09	7	Au	3	·62
4528	1484	1349	27M	·2286	0·6298	14·800	**1427**	5 7	Mr Ap	27○ 26	·86 ·39	1	My	25	·93	3	Je	24	·46	4	Jl	23	·99	6	Au	22	·52
4529	1485	1350	26M	·4878	19·2687	12·933	**1428**	4	Ap	14	·76	6	My	14	·29	7	Je	12	·82	2	Jl	12	·35	3	Au	10	·88
4530	1486	1351	26M	·7461	8·3770	9·090	**1429**	2	Ap	4	·13	3	My	3	·66	5	Je	2	·19	6	Jl	1	·72	1 2	Jl Au	31 29○	·25 ·78
4531	1487	1352	27M	·0049	27·0159	7·224	**1430**	1	Ap	23	·03	2	My	22	·56	4	Je	21	·09	5	Jl	20	·62	7	Au	19●○	·15
4532	1488	1353	27M	·2636	16·1242	3·381	**1431**	5	Ap	12	·39	6	My	11	·92	1	Je	10	·45	2	Jl	9○	·99	4	Au	8●	·52

N.B.—For tithis by other siddhāntas, add to the above algebraically as follows :—

Sūrya siddhānta—*cont.*

Āśvina.				Kārttika.				Mārgaśirsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
1	S	11○	·88	3	O	11	·41	4	N	9	·94	6	D	9	·47	80	1	Jr	8	·00		2	F	6	·53	4	Mr	7	·06
6	Au	31	·25	7	S	29○	·78	Mārgasira Kshaya				3	N	27	·84		5	D	27	·87	81	6	Jr	25	·90	1	F	24	·43
				2	O	29	·31																						
5	S	19○	·14	6	O	18●	·67	1	N	17	·20	2	D	16	·73	82	4	Jr	15	·27		5	F	13	80	7	Mr	15○	33
2	S	8○	·51	4	O	8	·04	5	N	6	·57	7	D	6	·10	83	1	Jr	4	·68		3	F	3	·16	4	Mr	4	·69
1	S	27	·41	2	O	26	·94	4	N	25	47	6	D	25	·00	84	7	Jr	23○	55		2	F	22	·06	3	Mr	22	·59
5	S	15	·77	7	O	15	·31	1	N	13	84	3	D	13	·37	85	4	Jr	11○	·90		6	F	10	·43	7	Mr	11	96
3	S	5	·14	4	O	4	67	6	N	3	·20	7	D	2	73	86	2	Jr	1●○	·26		3	Jr	30	79	5	Mr	1	·33
2	S	24	·04	3	O	23	·57	5	N	22	·10	6	D	21●	63	87	1	Jr	20	·16		2	F	18	·69	4	Mr	20	·22
6	S	13	·41	7	O	12	·94	2	N	11○	·47	4	D	11●	·00	88	5	Jr	9	53		7	F	8	·06	1	Mr	8	·59
3	S	1	·77	5	O	1	30	6	O	30○	83	1	N	29	·37		2	D	28	·90	89	4	Jr	27	48	5	F	25	·96
2	S	20	.67	4	O	20○	·20	5	N	18	73	7	D	18	·26	90	1	Jr	16	·79		3	F	15	32	4	Mr	16	·85
7	S	10	04	1	O	9●	·57	3	N	8	·10	4	D	7	·63	91	6	Jr	6	·16		7	F	4	69	2	Mr	6○	·22
5	S	28	.94	7	O	28	47	2	N	27	·00	3	D	26	53	92	5	Jr	25	·06		6	F	23○	·59	1	Mr	24	12
3	S	17	·30	4	O	16	83	6	N	15	36	7	D	14	·89	93	2	Jr	13	·43		3	F	11○	96	5	Mr	13	·49
7	S	6	·67	2	O	6	·20	3	N	4	·73	5	D	4	·26	94	6	Jr	2	79		1	F	1●	·32	2	Mr	2	·85
6	S	25	·57	1	O	25	·10	2	N	23	·63	4	D	23	·16	95	5	Jr	21	69		7	F	20	·22	1	Mr	21	·75
3	S	14	·98	5	O	14	·47	7	N	13	·00	1	D	12○	·53	96	3	Jr	11	·06		4	F	9	·59	6	Mr	10	·12
1	S	3	·30	2	O	2	·83	4	N	1	·36	5	N	30○	80		7	D	30	·42	97	1	Jr	28	·95	3	F	27	·49
7	S	22	20	1	O	21	78	3	N	20	·26	4	D	19	·79	98	6	Jr	18	·32		7	F	16	·85	2	Mr	18	·38
4	S	11	·57	6	O	11○	10	7	N	9●	63	2	D	9	·16	99	3	Jr	7	·69		5	F	6	·22	6	Mr	7	·75
1	Au	31	·93	3	S	30○	·46	6	N	28	·53	Pausha Kshaya				14	1	D	28	·06	00	2	Jr	26	·59	4	Fr	25	·12
				4	O	29	·99																			5	Mr	25●○	·65
7	S	18○	·83	2	O	18	·36	3	N	16	·89	5	D	16	42	01	6	Jr	14	95		1	F	13	·48	3	Mr	15●	01
5	S	8●	20	6	O	7	·73	1	N	6	·26	2	D	5	·79	02	4	Jr	4	·32		5	F	2○	·85	7	Mr	4●	·38
4	S	27	·10	5	O	26	·63	7	N	25	·16	1	D	24	·69	03	3	Jr	23○	·22		4	F	21	·75	6	Mr	23	·28
1	S	16	·46	2	O	15	·99	4	N	14	52	6	D	14	·05	04	7	Jr	12○	59	05	2	F	11	12	3	Mr	11	·65
5	S	4	·88	7	O	4	·36	1	N	2	·89	3	D	2	·42		4	D	31●	.95		6	Jr	30	·48	1	Mr	1	·01
4	S	23	·73	6	O	23	·26	7	N	21○	·79	2	D	21	32	06	3	Jr	19	.85		5	F	18	·38	6	Mr	19	91
2	S	13	09	3	O	12	·63	5	N	11○	·16	6	D	10	·69	07	1	Jr	9	·22	08	2	F	7	75	4	Mr	9	·28
6	S	2	·46	7	O	1	·49	2	O	31○	·52	4	N	30	05		5	D	29	·58		7	Jr	28	·11	1	F	26	·64
5	S	20	·36	6	O	19●	·89	1	N	18	·42	2	D	17	·95	09	4	Jr	16	·48		6	F	15	01	7	Mr	16○	·54
2	S	9	·73	4	O	8●	·26	5	N	7	·79	7	D	7	·32	10	1	Jr	5	·85		3	F	4	·38	4	Mr	5○	·91
1	S	28	·62	3	O	28	·15	4	N	26	·69	6	D	26	·22	11	7	Jr	24	·75		2	F	23○	28	3	Mr	24	·81
5	S	17	·99	7	O	17	·52	2	N	16	·05	3	D	15	58	12	5	Jr	14	11		6	F	12●	·64	1	Mr	13	·17
3	S	6	·36	4	O	5	·89	6	N	4	42	7	D	3	·95	13	2	Jr	2	·48		4	F	1●	01	5	Mr	2	·54
2	S	25	26	3	O	24	·79	5	N	23	·32	6	D	22○	·85	14	1	Jr	21	38		2	F	19	·91	4	Mr	21	·44
6	S	14	·62	1	O	14	·15	2	N	12	68	4	D	12○	·21	15	5	Jr	10	·75	16	7	F	9	·28	1	Mr	10	·81
3	S	3	·99	5	O	3	·52	7	N	2	·05	1	D	1	58		3	D	31	·11		4	Jr	29	·64	6	Fr	28	·17
2	S	21	89	4	O	21○	·42	5	N	19	.95	7	D	19	·48	17	2	Jr	18	·01		3	F	16	·54	5	Mr	18	·07
7	S	11	25	1	O	10○	·79	3	N	9	·32	4	D	8	·85	18	6	Jr	7	·38		7	F	5	91	2	Mr	7	44
4	Au	31	·62	6	S	30○	·15	2	N	28	·21	3	D	27	·74	19	5	Jr	26	·27		6	F	24	·81	1	Mr	26●○	·34
				7	O	29	68																						
3	S	19	·52	5	O	19	·05	6	N	17	·58	1	D	17	11	20	2	Jr	15	64		4	F	14○	·17	5	Mr	14	70
7	S	7●	·89	2	O	7	·42	3	N	5	·95	5	D	5	·48	21	7	Jr	4	01		1	F	2○	·54	3	Mr	4	07
6	S	26	·78	1	O	26	·31	2	N	24	·85	4	D	24	·38	22	5	Jr	22●○	·91		7	F	21	·44	1	Mr	22	·97
4	S	16	15	5	O	15	·68	7	N	14	·21	1	D	13	·74	23	3	Jr	12	·27		4	F	10	·80	6	M	12	·83
1	S	5	52	3	O	5	·05	4	N	3	58	6	D	3○	·11	24	7	Jr	1●	·64		2	Jr	31	17	3	F	29	70
7	S	23	42	1	O	22	·95	3	N	21○	·48	5	D	21	·01	25	6	Jr	19	·54		1	F	18	·07	2	M	19	·60
4	S	12	·78	6	O	12	·31	7	N	10●○	·84	2	D	10	·37	26	3	Jr	8	·91		5	F	7	44	6	Mr	8	·97
2	S	2	15	3	O	1	·68	5	O	31	·21	6	N	29	·74		1	D	29	·27	27	2	Jr	27	·80	4	F	26	·88
1	S	21	05	2	O	20	·58	4	N	19	·11	5	D	18	·64	28	7	Jr	17	·17		1	F	15	70	3	Mr	16○	·23
5	S	9○	·42	6	O	8●	·95	1	N	7	·48	3	D	7	·01	29	4	Jr	5	·54		6	F	4	·07	7	Mr	5●○	·60
4	S	28	·31	5	O	27	·84	7	N	26	·37	1	D	25	·90	30	3	Jr	24	48		4	F	22	·96	6	Mr	24	·50
1	S	17	·68	3	O	17	21	4	N	15	·74	6	D	15	·27	31	7	Jr	13	·80		2	F	12	·33	3	Mr	13	·86
6	S	7	·05	7	O	6	·58	2	N	5	·11	3	D	4	·64	32	5	Jr	3○	·17		6	F	1●	·70	1	Mr	2	·23

(1) for Ārya siddhānta +·03; (2) for Brahma siddhānta —·08; and (3) for Siddhanta Śirōmaṇi —·02.

TABLE II.—

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Fraction of day.	First new-moon in solar year.	Anomaly of first new moon	Christian era. A.D.	Vaiśākha. Week-day.	Month	Day.	Fraction.	Jyeshṭha. Week-day.	Month.	Day.	Fraction.	Āshaḍha. Week-day.	Month.	Day.	Fraction	Śrāvana. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day.	Month.	Day.	Fraction.
4533	1489	1354	26M	·5224	5·2325	27.093	**1432**	2	Mr	31	·76	4	Ap	30	·29	5 7	My Je	29 28○	·82 ·35	1	Jl	27	·88	3	Au	26	·41
4534	1490	1355	26M	·7811	23 8714	25·226	**1433**	1	Ap	19	·66	3	My	19	·19	4	Je	17○	·72	6	Jl	17	·25	7	Au	15	·78
4535	1491	1356	27M	·0399	12 9797	21·388	**1434**	6	Ap	9	·03	7	My	8	·56	2	Je	7●	·09	3	Jl	6	·62	5	Au	5	15
4536	1492	1357	27M	2986	2·0880	17 541	**1435**	3	Mr	29	·39	4 6	Ap My	27○ 27	·92 ·45	7	Je	25	98	2	Jl	25	·51	4	Au	24	·05
4537	1493	1358	26M	·5574	20 7269	15 674	**1436**	2	Ap	16○	·29	3	My	15	·82	5	Je	14	·35	6	Jl	13	·88	1	Au	12	·41
4538	1494	1359	26M	·8162	9·8352	11·831	**1437**	6	Ap	5○	·66	1	My	5	·19	2	Je	3	·72	4	Jl	3	·25	5	Au	1	·78
4539	1495	1360	27M	·0749	28·4741	9·964	**1438**	5	Ap	24	55	7	My	24	09	1	Je	22	·62	3	Jl	22	·15	4	Au	20	·68
4540	1496	1361	27M	·3837	17 5824	6 122	**1439**	2	Ap	13	·92	4	My	13	·45	5	Je	11	·98	7	Jl	11	·51	2	Au	10○	·04
4541	1497	1362	26M	·5924	6·6907	2·279	**1440**	7	Ap	2	·29	1	My	1	81	3	My	31	·35	4 6	Je Jl	29 29○	·88 ·41	7	Au	27	·94
4542	1498	1363	26M	·8512	25·3295	0·412	**1441**	6	Ap	21	·19	7	My	20	·72	2	Je	19	·25	3	Jl	18●	·78	5	Au	17	·31
4543	1499	1364	27M	·1099	14·4378	24·124	**1442**	3	Ap	10	55	5	My	10	·08	6	Je	8○	·61	1	Jl	8	·15	2	Au	6	·68
4544	1500	1365	27M	·3687	3·5461	20·281	**1443**	7	Mr	30	·92	2	Ap	29	·45	3 5	My Je	28○ 27	·98 ·51	7	Jl	27	·04	1	Au	25	·57
4545	1501	1366	26M	·6275	22·1850	18·414	**1444**	6	Ap	17	·82	1	My	17○	·35	2	Je	15	·88	4	Jl	15	·41	5	Au	13	·94
4546	1502	1367	26M	·8862	11·2933	14·572	**1445**	4	Ap	7	·18	5	My	6●	·71	7	Je	5	·25	1	Jl	4	·78	3	Au	3	·31
4547	1503	1368	27M	·1450	0·4016	10 729	**1446**	1 3	Mr Ap	27○ 26●	·55 ·08	4	My	25	·61	6	Je	24	·14	7	Jl	23	·67	2	Au	22	·20
4548	1504	1369	27M	4037	19 0405	8 862	**1447**	7	Ap	15	·45	1	My	14	·98	3	Je	13	·51	5	Jl	13	·04	6	Au	11	·57
4549	1505	1370	26M	·6625	8 1488	5·019	**1448**	4	Ap	3	·82	6	My	3	·35	7	Je	1	·88	2	Jl	1	·41	3 5	Jl Au	30 29●○	·94 ·47
4550	1506	1371	26M	·9212	26·7877	3 153	**1449**	3	Ap	22	·71	5	My	22	24	6	Je	20	·77	1	Jl	20○	·31	2	Au	18	·84
4551	1507	1372	27M	·1800	15·8960	26·864	**1450**	1	Ap	12	·08	2	My	11	·61	4	Je	10	·14	5	Jl	9○	·67	7	Au	8	·20
4552	1508	1373	27M	·4387	5·0043	23·022	**1451**	5	Ap	1	·45	6	Ap	30	·98	1 3	My Je	30 29○	·51 ·04	4	Jl	28	·57	6	Au	27	·10
4553	1509	1374	26M	·6975	23·6432	21·155	**1452**	4	Ap	19	·35	5	My	18	·88	7	Je	17	.41	1	Jl	16	·94	3	Au	15	·47
4554	1510	1375	26M	·9563	12·7515	17·312	**1453**	1	Ap	8	·71	3	My	8○	·24	4	Je	6●	·77	6	Jl	6	·30	7	Au	4	·83
4555	1511	1376	27M	·2150	1·8598	13 469	**1454**	6	Mr	29	·08	7 2	Ap My	27●○ 27	·61 14	3	Je	25	·67	5	Jl	25	.20	6	Au	23	·73
4556	1512	1377	27M	·4738	20·4987	11 603	**1455**	4	Ap	16●○	·98	6	My	16	·51	1	Je	15	·04	2	Jl	14	·57	4	Au	13	·10
4557	1513	1378	26M	·7325	9 6070	7·760	**1456**	2	Ap	5●	·34	3	My	4	·87	5	Je	3	41	6	Jl	2	·94	1	Au	1	·47
4558	1514	1379	26M	·9913	28·2459	5·893	**1457**	1	Ap	24	·24	2	My	23	·77	4	Je	22	·30	5	Jl	21	·83	7	Au	20○	·36
4559	1515	1380	27M	·2500	17·3542	2 050	**1458**	5	Ap	13	·61	7	My	13	·14	1	Je	11	·67	3	Jl	11	·20	4	Au	9○	·73
4560	1516	1381	27M	·5088	6·4625	25·762	**1459**	2	Ap	2	·98	4	My	2	·51	6	Je	1	·04	7 2	Je Jl	30 30	·57 ·10	3	Au	28	·63
4561	1517	1382	26M	·7676	25 1013	23·896	**1460**	1	Ap	20	·87	3	My	20	·40	4	Je	18○	·93	6	Jl	18●	·47	1	Au	17	·00
4562	1518	1383	27M	·0253	14·2096	20 053	**1461**	6	Ap	10	·24	7	My	9	·77	2	Je	8○	·30	3	Jl	7●	·83	5	Au	6	·36
4563	1519	1384	27M	·2851	3 3179	16·210	**1462**	3	Mr	30	·61	5	Ap	29	·14	6 1	My Je	28●○ 27	·67 ·20	2	Jl	26	·73	4	Au	25	·26
4564	1520	1385	27M	·5438	21·9568	14·343	**1463**	2	Ap	18	·51	4	My	18●	·04	5	Je	16	·57	7	Jl	16	·10	1	Au	14	·63
4565	1521	1386	26M	·8026	11·0651	10·501	**1464**	6	Ap	6○	·87	1	My	6●	·40	2	Je	4	·93	4	Jl	4	·46	5	Au	2	·99
4566	1522	1387	27M	·0613	0·1734	6·658	**1465**	5	Ap	25	·77	7	My	25	·30	1	Je	23	·83	3	Jl	23	·36	4	Au	21	·89
4567	1523	1388	27M	·3201	18·8123	4 781	**1466**	3	Ap	15	·15	4	My	14	·67	6	Je	13	·20	7	Jl	12	78	2	Au	11	·26
4568	1524	1389	27M	·5789	7·9206	0·948	**1467**	7	Ap	4	·50	2	My	4	·03	3	Je	2	·56	5	Jl	2	·09	6 1	Jl Au	31○ 30	·63 ·16
4569	1525	1390	26M	·8376	26·5595	26·636	**1468**	6	Ap	22	·40	7	My	21	·93	2	Je	20	·46	3	Jl	19○	·99	5	Au	18	·52
4570	1526	1391	27M	·0964	15·6678	22·793	**1469**	3	Ap	11	·77	5	My	11	·30	6	Je	9	·83	1	Jl	9●○	·36	2	Au	7	·89
4571	1527	1392	27M	·3551	4·7761	18·951	**1470**	1	Ap	1	·14	2	Ap	30	·67	4 5	My Je	30 28●	·20 ·73	7	Jl	28	·26	1	Au	26	·79
4572	1528	1393	27M	·6139	23·4150	17 084	**1471**	7	Ap	20	·08	1	My	19○	·56	3	Je	18	·09	4	Jl	17	·62	6	Au	16	·16
4573	1529	1394	26M	·8726	12·5233	13·241	**1472**	4	Ap	8	·40	5	My	7○	·93	7	Je	6	·46	1	Jl	5	·99	3	Au	4	·52
4574	1530	1395	27M	·1314	1·6316	9·398	**1473**	1	Mr	28	·77	3 4	Ap My	27●○ 26	·30 ·83	6	Je	25	·36	7	Jl	24	·89	2	Au	23	·42
4575	1531	1396	27M	·3901	20·2705	7·532	**1474**	7	Ap	16●	·67	2	My	16	·20	3	Je	14	·73	5	Jl	14	·26	6	Au	12	·79
4576	1532	1397	27M	·6489	9·3788	3·689	**1475**	5	Ap	6	·03	6	My	5	·56	1	Je	4	·09	2	Jl	3	·62	4	Au	2	·15
4577	1533	1398	26M	·9077	28·0176	1·822	**1476**	3	Ap	23	·93	5	My	23	·46	6	Je	21	·99	1	Jl	21	·52	3	Au	20○	·05
4578	1534	1399	27M	·1654	17 1259	25·534	**1477**	1	Ap	13	·30	2	My	12	83	4	Je	11	·36	5	Jl	10	·89	7	Au	9	·42
4579	1535	1400	27M	·4252	6·2342	21·691	**1478**	5	Ap	2	·66	7	My	2	·19	1	My	31	·72	3 4	Je Jl	30○ 29●	·25 ·78	6	Au	28	·31
4580	1536	1401	27M	·6839	24·8781	19·825	**1479**	4	Ap	21	·56	6	My	21	·09	7	Je	19○	·62	2	Jl	19	·15	3	Au	17	·68
4581	1537	1402	26M	·9427	13·9814	15 982	**1480**	1	Ap	9	·93	3	My	9	·46	4	Je	7●○	·99	6	Jl	7	·52	1	Au	6	·05
4582	1538	1403	27M	·2014	3·0897	12·139	**1481**	6	Mr	30	·30	7	Ap	28	·83	2 3	My Je	28 26	·36 ·89	5	Jl	26	·42	6	Au	24	·95
4583	1539	1404	27M	·4602	21·7286	10·272	**1482**	5	Ap	18○	·19	6	My	17	·72	1	Je	16	·25	2	Jl	15	·78	4	Au	14	·31
4584	1540	1405	27M	·7190	10·8369	6·430	**1483**	2	Ap	7○	·56	4	My	7	·09	5	Je	5	·62	7	Jl	5	·15	1	Au	3	·68
4585	1541	1406	26M	·9777	29·4758	4·568	**1484**	1	Ap	25	·46	2	My	24	·99	4	Je	23	·52	6	Jl	23	·05	7	Au	21	·58

N.B.—For tithis by other siddhāntas add to the above algebraically as follows :—

Sūrya siddhānta—*cont.*

Āśvina				Kārttika				Mārgaśīrsha				Pausha				A.D.	Māgha				A.D.	Phālguna				Chaitra			
Week-day.	Month.	Day.	Fraction	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction	Week-day.	Month.	Day	Fraction.		Week day.	Month	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
4	S	24	·94	6	O	24	·47	1	N	23	01	2	D	22○	·54	**33**	4	Jr	21	07		5	F	19	60	7	Mr	21	·13
2	S	14	·31	3	O	13	·84	5	N	12	·37	6	D	11	·90	**34**	1	Jr	10	43		2	F	8	·96	4	Mr	10	·49
6	S	3	·68	1	O	3	·21	2	N	1	·74	4	D	1	·27		5	D	30	80	**35**	7	Jr	29	·33	1	F	27	·86
5	S	22	·58	7	O	22○	·11	1	N	20●	·64	3	D	20	·17	**36**	4	Jr	18	·70		6	F	17	·23	7	Mr	17	·76
2	S	10	·94	4	O	10○	·47	6	N	9	00	7	D	8	·53	**37**	2	Jr	7	07		3	F	5	·60	5	Mr	7	·13
7	Au	31	·31	1 3	S O	29● 29	84 ·37	4	N	27	90	6	D	27	·43	**38**	7	Jr	25	96		2	F	24○	·49	4	Mr	26	·02
6	S	19●	·21	7	O	18	·74	2	N	17	·27	3	D	16	·80	**39**	5	Jr	15	·33		6	F	13○	·86	1	Mr	15	·39
3	S	8	·57	5	O	8	·11	6	N	6	64	1	D	6	·17	**40**	2	Jr	4	·70		4	F	3○	·23	5	Mr	3	·76
2	S	26	·47	4	O	26	·00	5	N	24	53	7	D	24	·06	**41**	1	Jr	22●	59		3	F	21	·13	4	Mr	22	·66
6	S	15	·84	1	O	15	·37	2	N	13	90	4	D	13○	·43	**42**	5	Jr	11●	96		7	F	10	·49	2	Mr	12	·02
4	S	5	21	5	O	4	74	7	N	3	·27	1	D	2○	·80	**43**	3	Jr	1	·33		4	Jr	30	·86	6	Mr	1	·39
3	S	24	·10	4	O	23	·63	6	N	22○	·17	7	D	21	·70	**44**	2	Jr	20	·23		3	F	18	·76	5	Mr	19	·29
7	S	12	47	2	O	12	00	3	N	10●	·53	5	D	10	·06	**45**	6	Jr	8	59		1	F	7	·12	2	Mr	8	·65
4	S	1	·84	6	O	1	·37	7	O	30	·90	2	N	29	·43		3	D	28	96	**46**	5	Jr	27	·49	7	F	26	·02
3	S	20○	·73	5	O	20	·27	6	N	18	·80	1	D	18	·33	**47**	2	Jr	16	·86		4	F	15	·39	5	Mr	16○	92
1	S	10●○	·10	2	O	9	·63	4	N	8	·16	5	D	7	·69	**48**	7	Jr	6	·22		1	F	4	·75	3	Mr	5●	·29
7	S	28	·00	1	O	27	·53	3	N	26	06	4	D	25	·59	**49**	6	Jr	24	·12		7	F	22	65	2	Mr	24	·18
4	S	17	·37	5	O	16	·90	7	N	15	·43	1	D	14	96	**50**	3	Jr	13○	49		5	F	12	02	6	Mr	13	·55
1	S	6	·73	3	O	6	·26	4	N	4	79	6	D	4	·33	**51**	7	Jr	2○	·86		2	F	1	·39	3	Mr	2	·92
7	S	25	·63	2	O	25	·16	3	N	23	69	5	D	23●	·22	**52**	6	Jr	21	·75		1	F	20	·28	2	Mr	20	·81
5	S	14	·00	6	O	13	53	1	N	12	06	2	D	11●	·59	**53**	4	Jr	10	12		5	F	8	·65	7	Mr	10	·18
2	S	3	·37	3	O	2	90	5	N	1○	·43	6	N	30	96		1	D	30	49	**54**	3	Jr	29	·02	4	F	27	·55
1	S	22	26	2	O	21○	79	4	N	20	32	5	D	19	·85	**55**	7	Jr	18	39		1	F	16	·92	3	Mr	18	45
5	S	11	·63	7	O	11	16	1	N	9	69	3	D	9	·22	**56**	4	Jr	7	75		6	F	6	·28	7	Mr	6○	·81
3	Au	31	·00	4 6	S O	29 29	53 ·06	7	N	27	·59	2	D	27	·12	**57**	3	Jr	25	65		5	F	24○	·18	6	Mr	25	·71
1	S	18	·89	3	O	18	·43	4	N	16	·96	6	D	16	·49	**58**	1	Jr	15	02		2	F	13○	·55	4	Mr	15	·08
6	S	8	·26	7	O	7	79	2	N	6	·32	3	D	5	85	**59**	5	Jr	4	·38		6	F	2●	·91	1	Mr	4	·45
5	S	27	·16	6	O	26	69	1	N	25	·22	2	D	24○	·75	**60**	4	Jr	23	28		5	F	21	81	7	Mr	22	·34
2	S	15	·53	4	O	15	·06	5	N	13	59	7	D	13○	12	**61**	1	Jr	11	·65		3	F	10	·18	4	Mr	11	71
6	S	4	·89	1	O	4	·42	2	N	2	·95	4	D	2●○	·49	**62**	6	Jr	1	·02		7	Jr	30	·55	2	Mr	1	·08
5	S	23	·79	7	O	23	·32	1	N	21●	·85	3	D	21	·38	**63**	4	Jr	19	·91		6	F	18	·44	7	Mr	19	·97
3	S	13	·16	4	O	12	·69	6	N	11●	·22	7	D	10	75	**64**	2	Jr	9	·28		3	F	7	·81	5	Mr	8	·34
7	S	1	·53	2	O	1○	·06	3	O	30	·59	5	N	29	·12		6	D	28	65	**65**	1	Jr	27	·18	2 4	F Mr	25 27○	·71 ·24
6	S	20○	·42	7	O	19	·95	2	N	18	·48	4	D	18	·01	**66**	5	Jr	16	·55		7	F	15	·08	1	Mr	16	·61
3	S	9○	·79	5	O	9	·32	6	N	7	85	1	D	7	·38	**67**	2	Jr	5	·91		4	F	4	·44	5	Mr	5●	97
2	S	28	·69	4	O	28	·22	5	N	26	75	7	D	26	28	**68**	1	Jr	24○	·81		3	F	23	·34	4	Mr	23	·87
7	S	17	05	1	O	16	58	3	N	15	11	4	D	14	64	**69**	6	Jr	13○	·17		7	F	11	·70	2	Mr	13	·23
4	S	6	·42	5	O	5	95	7	N	4	48	2	D	4	01	**70**	3	Jr	2○	54		5	F	1	·07	6	Mr	2	·60
3	S	25	·32	4	O	24	·85	6	N	23	38	7	D	22	91	**71**	2	Jr	21	44		3	F	19	·97	5	Mr	21	·50
7	S	14	·69	2	O	14	·22	3	N	12○	·75	5	D	12	·28	**72**	6	Jr	10	·81		1	F	9	34	2	Mr	9	87
5	S	3	05	6	O	2	·58	1	N	1○	11	2	N	30	64		4	D	30	·17	**73**	5	Jr	28	·70	7	F	27	·23
3	S	21	95	5	O	21○	·48	7	N	20	01	1	D	19	54	**74**	3	Jr	18	·07		4	F	16	·60	6	Mr	18	·13
1	S	11	32	2	O	10●	·85	4	N	9	·38	5	D	8	·91	**75**	7	Jr	7	·44		1	F	5	·97	3	Mr	7○	50
5 7	Au S	31○ 30●	68 ·21	1	O	29	·74	3	N	28	·27	4	D	27	·81		**Magha Kshaya**				**76**	6 7	Jr F	26 24●○	·33 86	2	Mr	25	·39
4	S	18	58	6	O	18	11	7	N	16	·64	2	D	16	·17	**77**	3	Jr	14	·70		5	F	13	·23	6	Mr	14	·76
1	S	7	·95	3	O	7	48	5	N	6	01	6	D	5	·54	**78**	1	Jr	4	·07		2	F	2	60	4	Mr	4	·13
7	S	26	·84	2	O	26	·37	3	N	24	·90	5	D	24○	·43	**79**	6	Jr	22	96		1	F	21	·49	3	Mr	23	·02
5	S	16	·21	6	O	15	·74	1	N	14	·27	2	D	13●○	80	**80**	4	Jr	12	·33		5	F	10	·86	7	Mr	11	·39
2	S	4	·58	4	O	4	11	5	N	2	·64	7	D	2	·17		1	D	31	·70	**81**	3	Jr	30	·23	4	F	28	·76
1	S	23	·48	3	O	23	·01	4	N	21●	·54	6	D	21	·07	**82**	7	Jr	19	·60		2	F	18	·13	3	Mr	19	·66
5	S	12	·85	7	O	12○	·38	1	N	10●	·91	3	D	10	44	**83**	4	Jr	8	·97		6	F	7	50	1	Mr	9	·03
3	S	2	·21	4	O	1○	·74	6	O	31	27	7	N	29	·80		2	D	29	·33	**84**	3	Jr	27	·86	5 6	F Mr	26 26	·39 ·92
2	S	20●○	·11	3	O	19	·64	5	N	18	·17	6	D	17	·70	**85**	1	Jr	16	·23		2	F	14	·76	4	Mr	16	·29

(1) for Ārya siddhānta + ·04; (2) for Brahma siddhānta —·09; and (3) for Siddhānta Śirômaṇi —·02.

TABLE II.—

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era.	Vaiśākha. Week-day.	Month.	Day.	Fraction.	Jyeshṭha. Week-day.	Month.	Day.	Fraction.	Āshāḍha. Week-day.	Month.	Day.	Fraction.	Śrāvaṇa. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day.	Month.	Day.	Fraction.
							A.D.																				
4586	1542	1407	27M	·2365	18·5841	0·720	**1485**	5	Ap	14	·83	7	My	14	·36	1	Je	12	·89	3	Jl	12	·42	4	Au	10○	·95
4587	1543	1408	27M	·4952	7·6924	24·432	**1486**	3	Ap	4	·19	4	My	3	·72	6	Je	2	·25	7 2	Jl Jl	1 31○	·78 ·31	3	Au	29	·84
4588	1544	1409	27M	·7540	26·8313	22·565	**1487**	2	Ap	23	·09	3	My	22	·62	5	Je	21	·15	6	Jl	20●○	·68	1	Au	19	·21
4589	1545	1410	27M	·0127	15·4396	18·722	**1488**	6	Ap	11	·46	7	My	10	·99	2	Je	9	·52	4	Jl	9●	·05	5	Au	7	·58
4590	1546	1411	27M	·2715	4·5479	14·880	**1489**	3	Mr	31	·82	5	Ap	30	·35	6 1	My Je	29○ 28	·88 ·41	2	Jl	27	·95	4	Au	26	·47
4591	1547	1412	27M	·5303	23·1868	13·013	**1490**	2	Ap	19	·72	4	My	19○	·25	5	Je	17	·78	7	Jl	17	·31	1	Au	15	·84
4592	1548	1413	27M	·7890	12·2951	9·173	**1491**	7	Ap	9	·09	1	My	8●○	·62	3	Je	7	·15	4	Jl	6	·68	6	Au	5	·21
4593	1549	1414	27M	·0478	1·4034	5·327	**1492**	4 5	Mr Ap	28 26	·46 ·99	7	My	26	·52	2	Je	25	·05	3	Jl	24	·58	5	Au	23	·11
4594	1550	1415	27M	8065	20·0423	3·461	**1493**	3	Ap	16●	·35	4	My	15	·88	6	Je	14	·41	7	Jl	13	·94	2	Au	12	·47
4595	1551	1416	27M	·5653	9·1506	27·173	**1494**	7	Ap	5	·72	2	My	5	·25	3	Je	3	·78	5	Jl	3	·31	6 1	Au Au	1 31○	·84 ·37
4596	1552	1417	27M	·8240	27·7894	25·306	**1495**	6	Ap	24	·62	1	My	24	·15	2	Je	22	·68	4	Jl	22	·21	5	Au	20●	·74
4597	1553	1418	27M	0828	16·8977	21·463	**1496**	3	Ap	12	·98	5	My	12	·52	7	Je	1:	·05	1	Jl	10	·58	3	Au	9	·11
4598	1554	1419	27M	·3415	6·0060	17·620	**1497**	1	Ap	2	·35	2	My	1	·88	4	My	31	·41	5 7	Je Jl	29○ 29●	·94 ·49	2	Au	28	·00
4599	1555	1420	27M	·6003	24·6449	15·754	**1498**	7	Ap	21	·25	1	My	20	·78	3	Je	19○	·31	4	Jl	18	·84	6	Au	17	·37
4600	1556	1421	27M	·8591	13·7532	11·911	**1499**	4	Ap	10	·62	6	My	10	·15	7	Je	8●	·68	2	Jl	8	·21	3	Au	6	·74
4601	1557	1422	27M	·1178	2·8615	8·068	**1500**	1	Mr	29	·98	3 5	Ap My	28○ 28●	·51 ·04	6	Je	26	·57	1	Jl	26	·10	2	Au	24	·63
4602	1558	1423	27M	·8766	21·5004	6·201	**1501**	7	Ap	17○	·88	2	My	17	·41	3	Je	15	·94	5	Jl	15	·47	7	Au	14	·00
4603	1559	1424	27M	·6353	10 6087	2·859	**1502**	5	Ap	7●	·24	6	My	6	·77	1	Je	5	·30	2	Jl	4	·84	4	Au	3	·37
4604	1560	1425	27M	·8941	29·2476	0·492	**1503**	4	Ap	26	·14	5	My	25	·67	7	Je	24	·20	1	Jl	23	·73	3	Au	22	·26
4605	1561	1426	27M	·1528	18·3559	24·204	**1504**	1	Ap	14	·51	3	My	14	·04	4	Je	12	57	6	Jl	12	·10	7	Au	10○	·63
4606	1562	1427	27M	·4116	7·4642	20·361	**1505**	5	Ap	3	·88	7	My	3	·41	1	Je	1	·94	3 5	Jl Jl	1 31○	·47 ·00	6	Au	29	·53
4607	1563	1428	27M	·6704	26·1081	18·494	**1506**	4	Ap	22	·77	6	My	22	·30	7	Je	20	·83	2	Jl	20●	·36	3	Au	18	·90
4608	1564	1429	27M	·9291	15·2114	14·651	**1507**	2	Ap	12	·14	3	My	11	·67	5	Je	10○	·20	6	Jl	9●	·73	1	Au	8	·26
4609	1565	1430	27M	·1879	4 3197	10 809	**1508**	6	Mr	31	51	1	Ap	30	·04	2 4	My Je	29○ 28	·57 ·10	5	Jl	27	·63	7	Au	26	·16
4610	1566	1431	27M	·4466	22·9586	8 942	**1509**	5	Ap	19	·40	6	My	18○	·94	1	Je	17	·47	3	Jl	17	·00	4	Au	15	·53
4611	1567	1432	27M	·7054	12·0669	5·099	**1510**	2	Ap	8	·77	4	My	8●	·30	5	Je	6	·83	7	Jl	6	·36	1	Au	4	89
4612	1568	1433	27M	·9641	1·1752	1·256	**1511**	7 1	Mr Ap	29○ 27	·14 67	3	My	27	·20	4	Je	25	·73	6	Jl	25	·26	7	Au	23	·79
4613	1569	1434	27M	·2229	19 8141	26·944	**1512**	6	Ap	16	04	7	My	15	·57	2	Je	14	·10	3	Jl	13	·63	5	Au	12	·16
4614	1570	1435	27M	·4816	8·9224	23 101	**1513**	3	Ap	5	·40	4	My	4	·93	6	Je	3	·46	1	Jl	3	·00	2 4	Au Au	1 31○	·53 ·06
4615	1571	1436	27M	·7404	27·5612	21·235	**1514**	2	Ap	24	·30	3	My	23	·83	5	Je	22	·36	6	Jl	21	·89	1	Au	20●	·42
4616	1572	1437	27M	·9992	16·6695	17·392	**1515**	6	Ap	13	·67	1	My	13	20	2	Je	11	·73	4	Jl	11○	·26	5	Au	9	79
4617	1573	1438	27M	·2579	5 7778	13·549	**1516**	4	Ap	2	·04	5	My	1	·57	7	My	31	·10	1 3	Je Jl	29○ 29	·63 ·16	4	Au	27	·69
4618	1574	1439	27M	·5167	24·4167	11·682	**1517**	2	Ap	20	·93	4	My	20	·46	5	Je	18●	·99	7	Jl	18	52	2	Au	17	·06
4619	1575	1440	27M	·7754	13·5250	7·840	**1518**	7	Ap	10	·30	1	My	9○	·82	3	Je	8●	·36	4	Jl	7	89	6	Au	6	·42
4620	1576	1441	28M	·0342	2·6333	8·997	**1519**	4	Mr	30	·67	6 7	Ap My	29○ 28	·20 ·73	2	Je	27	·26	3	Jl	26	·79	5	Au	25	32
4621	1577	1442	27M	2929	21·2722	2·130	**1520**	3	Ap	17○	·56	5	My	17	·10	6	Je	15	·63	1	Jl	15	·16	2	Au	13	69
4622	1578	1443	27M	·5517	10·3805	25·842	**1521**	7	Ap	6●	·93	2	My	6	·46	3	Je	4	·99	5	Jl	4	·52	7	Au	3	·05
4623	1579	1444	27M	·8105	29·0194	23·975	**1522**	5 6	Mr Ap	27 25	·30 ·83	1	My	25	·36	2	Je	23	·89	4	Jl	23	42	5	Au	21○	·95
4624	1580	1445	28M	·0692	18·1277	20·138	**1523**	4	Ap	15	·20	5	My	14	·78	7	Je	13	·26	1	Jl	12	·79	3	Au	11●○	·32
4625	1581	1446	27M	·3280	7·2360	16·290	**1524**	1	Ap	3	·56	3	My	3	·09	4	Je	1	·62	6	Jl	1	·16	7 2	Jl Au	30 29	·69 ·22
4626	1582	1447	27M	·5867	25·8749	14·423	**1525**	7	Ap	22	·46	2	My	22	·00	3	Je	20○	·52	5	Jl	20	·05	6	Au	18	·58
4627	1583	1448	27M	·8455	14·9832	10 580	**1526**	4	Ap	11	·83	6	My	11	·36	7	Je	9○	·89	2	Jl	9	·42	3	Au	7	·95
4628	1584	1449	28M	1042	4·0915	6·738	**1527**	2	Ap	1	·20	3	Ap	30	·73	5 6	My Je	30●○ 28	·26 ·79	1	Jl	28	32	2	Au	26	·85
4629	1585	1450	27M	·3680	22·7304	4·871	**1528**	1	Ap	19	·09	2	My	18●	·62	4	Je	17	·15	5	Jl	16	·68	7	Au	15	·22
4630	1586	1451	27M	6218	11·8387	1·028	**1529**	5	Ap	8○	·46	6	My	7	·99	1	Je	6	·52	3	Jl	6	05	4	Au	4	·58
4631	1587	1452	27M	·8805	0·9470	24·740	**1530**	2 4	Mr Ap	28●○ 27	·83 ·38	5	My	26	·89	7	Je	25	·42	1	Jl	24	·95	3	Au	23	·48
4632	1588	1453	28M	·1393	19·5858	22·878	**1531**	1	Ap	16	·72	3	My	16	·26	4	Je	14	·79	6	Jl	14	·32	7	Au	12	·85
4633	1589	1454	27M	·3980	8·6941	19·030	**1532**	6	Ap	5	·09	7	My	4	·62	2	Je	3	·15	3	Jl	2	·68	5 6	Au Au	1 30●	·21 ·74
4634	1590	1455	27M	·6568	27·3330	17·165	**1533**	4	Ap	23	·99	6	My	28	·52	1	Je	22	·05	2	Jl	21○	·58	4	Au	20●	·11
4635	1591	1456	27M	·9155	16·4413	13·321	**1534**	2	Ap	13	·86	3	My	12	·89	5	Je	11	·42	6	Jl	10○	·95	1	Au	9	·48
4636	1592	1457	28M	·1743	5·5496	9·478	**1535**	6	Ap	2	·72	1	My	2	·25	2	My	31	·78	4 5	Jl Jl	30● 29	·32 ·85	7	Au	28	·38
4637	1593	1458	27M	·4330	24·1885	7·61:	**1536**	5	Ap	20	·62	7	My	20○	·15	1	Je	18	·68	3	Jl	18●	·21	4	Au	16	·74
4638	1594	1459	27M	·6918	13·2968	3 769	**1537**	2	Ap	9	·99	4	My	9○	·52	6	Je	8	·05	7	Jl	7	·58	2	Au	6	·11

***N.B.*—For tithis by other siddhāntas add to the above algebraically as follows :—**

Sūrya siddhānta—*cont.*

Āśvina.				Kārttika.				Mārgaśīrsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
6	S	9●	·48	1	O	9	01	2	N	7	·54	4	D	7	·07	86	5	Jr	5	·60		7	F	4○	·13	1	Mr	5●	·66
5	S	28	·37	6	O	27	90	1	N	26	43	2	D	25	·96	87	4	Jr	24○	·49		6	F	23	·02	7	Mr	24	·55
2	S	17	74	4	O	17	·27	5	N	15	·80	7	D	15	·33	88	1	Jr	13○	·86		3	F	12	·39	4	Mr	12	·92
7	S	6	·11	1	O	5	·64	3	N	4	·17	4	D	3	·70	89	6	Jr	2	·28		7	Jr	31	·76	2	Mr	2	·29
6	S	25	00	7	O	24	·53	2	N	23○	·06	3	D	22●	59	90	5	Jr	21	·12		6	F	19	·65	1	Mr	21	·19
3	S	14	37	4	O	13	90	6	N	12○	·43	7	D	11	·96	91	2	Jr	10	·49		4	F	9	·02	5	Mr	10	·55
7	S	3	74	2	O	3	·27	3	N	1●○	80	5	D	1	33		6	D	30	·86	92	1	Jr	29	·30	2	F	27	92
6	S	21	.64	1	O	21●	·17	2	N	19	·70	4	D	19	·23	93	5	Jr	17	·76		7	F	16	·29	1	Mr	17○	·82
4	S	11○	00	5	O	10	·53	7	N	9	06	1	D	8	·59	94	3	Jr	7	·12		4	F	5	·65	6	Mr	7○	·18
2	S	29	90	4	O	29	·43	5	N	27	96	7	D	27	49	95	2	Jr	26	·03		3	F	24●	·56	5	Mr	26	·0
7	S	19	27	1	O	18	·80	3	N	17	·33	4	D	16	·86	96	6	Jr	15○	·39		7	F	13●	·92	2	Mr	14	·45
4	S	7	·64	6	O	7	·17	7	N	5	70	2	D	5	·23	97	3	Jr	3○	76		5	F	2	·29	6	Mr	3	82
3	S	26	54	5	O	26	·07	6	N	24	60	1	D	24○	·13	98	2	Jr	22	·66		4	F	21	·19	5	Mr	22	·72
7	S	15	90	2	O	15	·43	3	N	13	96	5	D	13●	49	99	7	Jr	12	·02		1	F	10	·55	3	Mr	12	·09
5	S	5	·27	6	O	4	·80	1	N	3	33	2	D	2	·86	15	4	Jr	1	·39	00	5	Jr	30	·92	7	F	29	·45
4	S	23	16	5	O	22○	·69	7	N	21	·22	1	D	20	75	01	3	Jr	19	·28		4	F	17	·81	6	Mr	19	·34
1	S	12	53	3	O	12●○	·06	4	N	10	·59	6	D	10	12	02	7	Jr	8	65		2	F	7	·18	3	Mr	8	·71
5	S	1	·89	7	O	1●○	·42	1	O	30	95	3	N	29	48		5	D	29	·01	03	6	Jr	27	·54	{ 1	F	26	·07
																										{ 2	Mr	27●	·61
4	S	20●	·79	6	O	20	·32	7	N	18	85	2	D	18	38	04	3	Jr	16	·91		5	F	15○	·44	6	Mr	15	·97
2	S	9	·16	3	O	8	·69	5	N	7	·22	6	D	6	·75	05	1	Jr	5	·28		2	F	3○	·81	4	Mr	5	34
1	S	28	·06	2	O	27	59	4	N	26	12	5	D	25	·65	06	7	Jr	24●○	·18		1	F	22	·71	3	Mr	24	·24
5	S	17	·43	6	O	16	·96	1	N	15	·49	3	D	15	·02	07	4	Jr	13●	·55		6	F	12	·08	7	Mr	13	·61
2	S	6	·79	4	O	6	·32	5	N	4	·85	7	D	4○	·38	08	1	Jr	2	·92		3	F	1	·45	4	Mr	1	·98
1	S	24	·69	3	O	24	·22	4	N	22○	·75	6	D	22	·28	09	7	Jr	20	·81		2	F	19	34	3	Mr	20	·87
6	S	14	·06	7	O	13	·59	2	N	12●○	·12	3	D	11	·65	10	5	Jr	10	18		6	F	8	·71	1	Mr	10	·24
3	S	3	·42	4	O	2	·96	6	N	1	·49	1	D	1	·02		2	D	30	·55	11	4	Jr	29	·08	5	F	27	·61
2	S	22○	·82	3	O	21	·85	5	N	20	·38	6	D	19	·91	12	1	Jr	18	·44		2	F	16	·98	4	Mr	17○	·51
6	S	10○	·69	1	O	10	·22	2	N	8	·75	4	D	8	·28	13	5	Jr	6	·81		7	F	5	·34	1	Mr	6●○	·87
5	S	29	·59	7	O	29	·12	1	N	27	·65	3	D	27	·18	14	4	Jr	25○	71		6	F	24	24	7	Mr	26	·77
2	S	18	·95	4	O	18	·48	6	N	17	·02	7	D	16	·55	15	2	Jr	15○	08		3	F	13	·61	5	Mr	15	·14
7	S	8	·32	1	O	7	·85	3	N	6	·38	4	D	5	·91	16	6	Jr	4●○	·44		7	F	2	·97	2	Mr	3	·50
6	S	26	·22	7	O	25	75	2	N	24	·28	3	D	23	·81	17	5	Jr	22	·34		6	F	20	·87	1	Mr	22	·40
3	S	15	·57	5	O	15	·12	6	N	13	·65	1	D	13●	·18	18	2	Jr	11	·71		4	F	10	·24	5	Mr	11	·77
7	S	4	·95	2	O	4	·48	4	N	3○	·01	5	D	2	54	19	7	Jr	1	·08		1	Jr	30	·61	3	Mr	1	·14
6	S	23	·85	1	O	23○	·38	2	N	21	·91	4	D	21	·44	20	5	Jr	19	·97		7	F	18	·50	2	Mr	19	·03
4	S	12	·22	5	O	11○	·75	7	N	10	·28	1	D	9	·81	21	3	Jr	8	·34		4	F	6	·87	6	Mr	8	·40
1	S	1	·58	{ 3	O	1	·12	**Mārgaśīrsha Kshaya**				6	N	29	·18		7	D	28	·71	22	2	Jr	27	·24	3	F	25○	·77
				{ 4	O	30	·65																						
7	S	20	·48	2	O	20	·01	3	N	18	·54	5	D	18	·07	23	6	Jr	16	·60		1	F	15○	·14	2	Mr	16	·67
4	S	9	·85	6	O	9	·38	7	N	7	·91	2	D	7	·44	24	3	Jr	5	·97		5	F	4○	·50	7	Mr	5	·03
3	S	27	·75	5	O	27	·28	6	N	25	·81	1	D	25	·34	25	2	Jr	23	87		4	F	22	·40	5	Mr	23	·98
1	S	17	·11	2	O	16	·64	4	N	15	·18	5	D	14○	·71	26	7	Jr	13●	·24		1	F	11	·77	3	Mr	13	·30
5	S	6	·48	7	O	6	·01	1	N	4	·54	3	D	4○	·07	27	4	Jr	2	·60		6	F	1	·13	7	Mr	2	·66
4	S	25	·38	5	O	24	·91	7	N	23○	·44	1	D	22	·97	28	3	Jr	21	50		5	F	20	·08	6	Mr	20	·58
1	S	13	·75	3	O	13	·28	4	N	11●	·81	6	D	11	·34	29	7	Jr	9	·87		2	F	8	40	3	Mr	9	·93
6	S	3	·11	7	O	2○	·64	2	N	1●	·17	3	N	30	·70		5	D	30	·24	30	6	Jr	28	·77	1	F	27	·30
5	S	22○	·01	6	O	21	·54	1	N	20	·07	2	D	19	·60	31	4	Jr	18	·13		5	F	16	·66	7	Mr	18○	·19
2	S	11○	·38	3	O	10	·91	5	N	9	·44	6	D	8	·97	32	1	Jr	7	·50		3	F	6	·08	4	Mr	6	·56
1	S	29	·28	2	O	28	·81	4	N	27	·84	5	D	26	·87	33	7	Jr	25○	·40		1	F	23	·93	3	Mr	25	·46
5	S	18	·64	7	O	18	·17	1	N	16	·70	3	D	16	·23	34	4	Jr	14○	·76		6	F	13	·30	7	Mr	14	·83
3	S	8	·01	4	O	7	·54	6	N	6	·07	7	D	5	·60	35	2	Jr	4	·13		3	F	2	·66	5	Mr	4	·19
1	S	26	·91	3	O	26	·44	4	N	24	·97	6	D	24	·50	36	1	Jr	23	·03		2	F	21	·56	4	Mr	23	09
6	S	15	·27	7	O	14	·80	2	N	13○	·84	3	D	12	·87	37	5	Jr	11	·40		6	F	9	·93	1	Mr	11	·46
3	S	4	·64	5	O	4	·17	6	N	2○	·70	1	D	2	·23		2	D	31	·76	38	4	Jr	30	·29	5	F	28	·82

(1) for Ārya siddhānta + ·04; (2) for Brahma siddhānta —·09; and (3) for Siddhānta Śiromaṇi —·02.

TABLE II.—

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year	Anomaly of first new moon.	Christian era. A.D.	Vaiśākha. Week-day, Month, Day.	Fraction.	Jyeshṭha. Week-day, Month, Day.	Fraction	Āshāḍha. Week-day, Month, Day.	Fraction.	Śrāvaṇa. Week-day, Month, Day.	Fraction	Bhādrapada. Week-day, Month, Day.	Fraction.
4639	1595	1460	27M	·9506	2·4057	27·481	**1538**	7 Mr 30	36	1 Ap 28○ / 3 My 28	·89 ·42	4 Je 26	·95	6 Jl 26	·48	1 Au 25	01
4640	1596	1461	28M	2093	21·0440	25·614	**1539**	6 Ap 18	25	7 My 17	·78	2 Je 16	·31	3 Jl 15	·84	5 Au 14	·38
4641	1597	1462	27M	·4681	10 1523	21·771	**1540**	3 Ap 6●	·62	5 My 6	·15	6 Je 4	68	1 Jl 4	21	2 Au 2	·74
4642	1598	1463	27M	7268	28 7912	19 904	**1541**	2 Ap 25	·52	4 My 25	·05	5 Je 23	·58	7 Jl 23	·11	1 Au 21●○	64
4643	1599	1464	27M	·9856	17·8995	16 062	**1542**	6 Ap 14	·88	1 My 14	·42	2 Je 12	95	4 Jl 12	48	6 Au 11●	01
4644	1600	1465	28M	·2443	7 0078	12·219	**1543**	4 Ap 4	·25	5 My 3	·78	7 Je 2	·31	1 Jl 1○ / 3 Jl 31	·84 37	4 Au 29	90
4645	1601	1466	27M	·5031	25·6467	10·352	**1544**	3 Ap 22	·15	4 My 21	·68	6 Je 20○	·21	7 Jl 19	·74	2 Au 18	·27
4646	1602	1467	27M	·7619	14 7550	6 509	**1545**	7 Ap 11	·52	2 My 11	05	3 Je 9●○	58	5 Jl 9	·11	6 Au 7	·64
4647	1603	1468	28M	0206	3 8633	2·667	**1546**	4 Mr 31	88	6 Ap 30	41	7 My 29 / 2 Je 28	·94 ·47	4 Jl 28	·01	5 Au 26	54
4648	1604	1469	28M	·2794	22·5022	0·800	**1547**	3 Ap 19○	·78	5 My 19●	·31	6 Je 17	·84	1 Jl 17	·37	2 Au 15	·90
4649	1605	1470	27M	·5381	11 6105	24 512	**1548**	1 Ap 8○	·15	2 My 7	·68	4 Je 6	·21	5 Jl 5	·74	7 Au 4	·27
4650	1606	1471	27M	·7969	0·7188	20·669	**1549**	5 Mr 28●○ / 7 Ap 27	·52 05	1 My 26	·58	3 Je 25	11	4 Jl 24	·64	6 Au 23	·17
4651	1607	1472	28M	·0556	19·3576	18 802	**1550**	4 Ap 16	·41	5 My 15	·94	7 Je 14	·47	2 Jl 14	·00	3 Au 12	·54
4652	1608	1473	28M	·3144	8·4659	14·959	**1551**	1 Ap 5	·78	3 My 5	·31	4 Je 3	84	6 Jl 3	87	7 Au 1○ / 2 Au 31●	·90 ·43
4653	1609	1474	27M	·5732	27·1048	13·093	**1552**	7 Ap 23	·58	2 My 23	·21	3 Je 21	·74	5 Jl 21○	·27	6 Au 19	·80
4654	1610	1475	27M	8319	16·2131	9·250	**1553**	5 Ap 13	·04	6 My 12	58	1 Je 11	·11	2 Jl 10	·64	4 Au 9	·17
4655	1611	1476	28M	0907	5·3214	5·407	**1554**	2 Ap 2	·41	3 My 1	·94	5 My 31○ / 7 Je 30	·47 ·00	1 Jl 29	·54	3 Au 28	·07
4656	1612	1477	28M	3494	23·9603	3·510	**1555**	1 Ap 21	·31	2 My 20○	·84	4 Je 19●	·37	5 Jl 18	·90	7 Au 17	·43
4657	1613	1478	27M	·6082	13 0686	27·253	**1556**	5 Ap 9	·68	7 My 9●○	21	1 Je 7	74	3 Jl 7	·27	4 Au 5	·80
4658	1614	1479	27M	·8669	2 1769	23·410	**1557**	3 Mr 30	·04	4 Ap 28 / 6 My 28	·57 ·10	7 Je 26	·64	2 Jl 26	·17	3 Au 24	70
4659	1615	1480	28M	·1257	20·8158	21 543	**1558**	1 Ap 17●	·94	3 My 17	·47	5 Je 16	·00	6 Jl 15	·53	1 Au 14	·06
4660	1616	1481	28M	·3844	9·9241	17·700	**1559**	6 Ap 7	·31	7 My 6	84	2 Je 5	·37	3 Jl 4	·90	5 Au 3	·43
4661	1617	1482	27M	·6432	28·5680	15·833	**1560**	5 Ap 25	·21	6 My 24	74	1 Je 23	·27	2 Jl 22	·80	4 Au 21●○	·38
4662	1618	1483	27M	·9020	17·6713	11·991	**1561**	2 Ap 14	·57	4 My 14	·10	5 Je 12	·63	7 Jl 12	·16	1 Au 10●	·70
4663	1619	1484	28M	·1607	6·7796	8 148	**1562**	6 Ap 3	·94	1 My 3	47	3 Je 2	·00	4 Jl 1○ / 6 Jl 31	·53 ·06	7 Au 29	·59
4664	1620	1485	28M	·4195	25·4185	6 281	**1563**	5 Ap 22	·84	7 My 22	·37	1 Je 20○	·90	3 Jl 20	·43	4 Au 18	·96
4665	1621	1486	27M	·6782	14 5268	2·438	**1564**	3 Ap 11	·20	4 My 10	·73	6 Je 9●	·27	7 Jl 8	·80	2 Au 7	·38
4666	1622	1487	27M	·9370	3 6351	26·150	**1565**	7 Mr 31	·57	2 Ap 30○	·10	3 My 29 / 5 Je 28	·68 ·16	6 Jl 27	·69	1 Au 26	·22
4667	1623	1488	28M	·1957	22·2740	24·283	**1566**	6 Ap 19○	·47	1 My 19	·00	2 Je 17	·58	4 Jl 17	·06	5 Au 15	59
4668	1624	1489	28M	·4545	11 3822	20 440	**1567**	3 Ap 8●○	·84	5 My 8	·37	6 Je 6	·90	1 Jl 6	·43	2 Au 4	·96
4669	1625	1490	27M	7133	0·4905	16·598	**1568**	1 Mr 28 / 2 Ap 26	20 ·73	4 My 26	26	5 Je 24	·79	7 Jl 24	·38	1 Au 22	·86
4670	1626	1491	27M	·9720	19 1294	14·731	**1569**	7 Ap 16	10	1 My 15	·68	3 Je 14	·16	4 Jl 13	·69	6 Au 12○	·22
4671	1627	1492	28M	2308	8 2377	10·888	**1570**	4 Ap 5	·47	6 My 5	·00	7 Je 3	·53	2 Jl 3	·06	3 Au 1○ / 5 Au 31	·59 ·12
4672	1628	1493	28M	·4895	26 8766	9·022	**1571**	3 Ap 24	·87	4 My 23	·90	6 Je 22	·43	7 Jl 21●○	96	2 Au 20	·49
4673	1629	1494	27M	·7483	15·9849	5·179	**1572**	7 Ap 12	·73	2 My 12	·26	3 Je 10○	·79	5 Jl 10●	·32	6 Au 8	·85
4674	1630	1495	28M	·0070	5·0932	1·386	**1573**	5 Ap 2	·10	6 My 1	·63	1 My 31○ / 2 Je 29	·16 69	4 Jl 29	·22	5 Au 27	·75
4675	1631	1496	28M	·2658	23 7321	27 024	**1574**	4 Ap 21	09	5 My 20○	53	7 Je 19	·06	1 Jl 18	·59	3 Au 17	·12
4676	1632	1497	28M	·5246	12·8404	23·181	**1575**	1 Ap 10	·36	2 My 9●	·89	4 Je 8	·42	5 Jl 7	·95	7 Au 6	·48
4677	1633	1498	27M	·7833	1·9487	19·339	**1576**	5 Mr 29○	·73	7 Ap 28 / 1 My 27	·26 ·79	3 Je 26	·32	4 Jl 25	·85	6 Au 24	·38
4678	1634	1499	28M	·0421	20·5876	17·472	**1577**	4 Ap 17	·63	6 My 17	·16	7 Je 15	·69	2 Jl 15	·22	3 Au 13	75
4679	1635	1500	28M	·3008	9·6959	13·629	**1578**	2 Ap 7	·00	3 My 6	53	5 Je 5	·06	6 Jl 4	·59	1 Au 3	·12
4680	1636	1501	28M	·5596	28·3348	11·762	**1579**	7 Ap 25	·89	2 My 25	·42	3 Je 23	·95	5 Jl 23	·49	7 Au 22●	·02
4681	1637	1502	27M	·8183	17·4431	7·919	**1580**	5 Ap 14	·26	6 My 13	·79	1 Je 12	·32	2 Jl 11○	·85	4 Au 10	·88
4682	1638	1503	28M	·0771	6·5514	4·077	**1581**	2 Ap 3	·63	4 My 3	·16	5 Je 1	·69	7 Jl 1○ / 1 Jl 30	·22 ·75	3 Au 29	·28
4683	1639	1504	28M	·3368	25 1903	2·210	**1582**	1 Ap 22	·53	3 My 22	·06	4 Je 20●	·59	6 Jl 20	·12	7 Au 18	·65
4684	1640	1505	28M	5946	14 2986	25·922	**1583**	5 Ap 11	·89	7 My 11○	·42	1 Je 9	·95	3 Jl 9	48	5 Au 8	·02
4685	1641	1506	27M	·8534	3·4069	22 079	**1584**	3 Mr 31	·26	4 Ap 29○	·79	6 My 29 / 7 Je 27	·32 ·85	2 Jl 27	·38	3 Au 25	·91
4686	1642	1507	28M	·1121	22·0457	20 212	**1585**	2 Ap 19○	·16	3 My 18	·69	5 Je 17	·22	6 Jl 16	·75	1 Au 15	·28
4687	1643	1508	28M	·3709	11·1540	16 370	**1586**	6 Ap 8	52	1 My 8	05	2 Je 6	·59	4 Jl 6	·12	5 Au 4	65
4688	1644	1509	28M	·6296	0·2623	12·527	**1587**	3 Mr 28 / 5 Ap 27	89 ·42	6 My 26	·95	1 Je 25	·48	3 Jl 25	·01	4 Au 23○	·54
4689	1645	1510	27M	8884	18·9012	10·660	**1588**	2 Ap 15	·79	4 My 15	32	5 Je 13	·85	7 Jl 13	·38	1 Au 11○	·91
4690	1646	1511	28M	·1471	8·0095	6·817	**1589**	7 Ap 5	16	1 My 4	·69	3 Je 3	·22	4 Jl 2	75	6 Au 1●○ / 7 Au 30	·28 ·81
4691	1647	1512	28M	·4059	26·6484	4·951	**1590**	6 Ap 24	·05	7 My 23	·58	2 Je 22○	·11	3 Jl 21●	·65	5 Au 20	·18
4692	1648	1513	28M	·6647	15·7567	1·108	**1591**	3 Ap 13	42	4 My 12	·95	6 Je 11○	·48	1 Jl 11	·01	2 Au 9	·54

N.B.—For tithis by other siddhāntas add to the above algebraically as follows :—

Sūrya siddhānta—*cont.*

Āśvina				Kārttika				Mārgaśīrsha				Pausha				A.D.	Māgha				A.D.	Phālguna				Chaitra			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction		Week-day.	Month.	Day.	Fraction.		Week-day	Month	Day.	Fraction	Week-day.	Month.	Day.	Fraction.
2	S	28	·54	4	O	23○	·07	5	N	21	·60	7	D	21	·13	39	1	Jr	19	·66		3	F	18	·19	4	Mr	19	·72
6	S	12	·91	1	O	12●	·44	2	N	10	·97	4	D	10	·50	40	6	Jr	9	·08		7	F	7	·56	2	Mr	8○	·09
{4	S	1○	·27	7	O	30	·33	1	N	28	·86	Pausha Kshaya					3	D	28	·40	41	4	Jr	26	·93	{6	F	25○	·46
{5	S	30	·80																							{7	Mr	26	·99
3	S	20	·17	4	O	19	·70	6	N	18	·23	7	D	17	·76	42	2	Jr	16	·29		3	F	14○	·82	5	Mr	16	·35
7	S	9	·54	2	O	9	·07	3	N	7	·60	5	D	7	13	43	6	Jr	5	·66		1	F	4	·19	2	Mr.	5	·72
6	S	28	·44	7	O	27	·97	2	N	26	·50	4	D	26○	·03	44	5	Jr	24●	·56		7	F	23	·09	1	Mr	23	·62
3	S	16	·80	5	O	16	·33	6	N	14	·86	1	D	14○	·39	45	2	Jr	12	·92		4	F	11	·45	5	Mr	12	·98
1	S	6	·17	2	O	5	·70	4	N	4	·23	5	D	3●○	·76	46	7	Jr	2	·29		1	Jr	31	82	3	Mr	2	·35
7	S	25	·07	1	O	24	·60	3	N	23●	·13	4	D	22	·66	47	6	Jr	21	·19		7	F	19	·72	2	Mr	21	·25
4	S	14	·43	5	O	13○	·96	7	N	12	·49	2	D	12	·02	48	3	Jr	10	·55		5	F	9	·08	6	Mr	9	·62
1	S	2	·80	3	O	2○	·33	4	O	31	86	6	N	30	·89		7	D	29	·92	49	2	Jr	28	·45	3	F	26	·98
7	S	21●○	·70	2	O	21	·23	3	N	19	·76	5	D	19	.29	50	6	Jr	17	·82		1	F	16	·35	2	Mr	17●	·88
5	S	11	·07	6	O	10	·60	1	N	9	·13	2	D	8	·66	51	4	Jr	7	·19		5	F	5○	·72	7	Mr	7	·25
3	S	29	·96	5	O	29	·49	7	N	28	02	1	D	27	·55	52	3	Jr	26○	·08		4	F	24	·61	6	Mr	25	·14
1	S	18	·33	2	O	17	·86	4	N	16	·39	5	D	15	·92	53	7	Jr	14●	·45		1	F	12	98	3	Mr	14	·51
5	S	7	·70	7	O	7	·23	1	N	5	·76	3	D	5	·29	54	4	Jr	3	·82		6	F	2	·35	7	Mr	3	·88
4	S	26	·60	6	O	26	·13	7	N	24○	·66	2	D	24	19	55	3	Jr	22	·72		5	F	21	·25	6	Mr	22	·78
1	S	15	·96	3	O	15	·49	5	N	14●○	02	6	D	13	·55	56	1	Jr	12	·08		2	F	10	·61	4	Mr	11	·14
6	S	4	·33	7	O	3	·86	2	N	2●○	·39	3	D	1	·92		5	D	31	·45	57	6	Jr	29	·98	1	F	28	·51
5	S	23	·22	6	O	22●	·76	1	N	21	·29	2	D	20	·82	58	4	Jr	19	·35		5	F	17	·88	7	Mr	19○	·41
2	S	12○	·59	4	O	12	·12	5	N	10	·65	7	D	10	18	59	1	Jr	8	·71		3	F	7	·24	4	Mr	8○	·77
{6	S	1○	·96	3	O	31	·02	4	N	29	·55	6	D	29	·08	60	7	Jr	27	·61		2	F	26●○	·14	3	Mr	26	·67
{1	O	1	·49																										
5	S	19	·86	7	O	19	·39	1	N	17	·92	3	D	17	·45	61	4	Jr	15	·98		6	F	14●	·51	1	Mr	16	·04
3	S	9	·22	4	O	8	·75	6	N	7	·28	7	D	6	·81	62	2	Jr	5○	·34		3	F	3	·87	5	Mr	5	·40
2	S	28	·12	3	O	27	·65	5	N	26	·18	6	D	25○	71	63	1	Jr	24	·24		2	F	22	·77	4	Mr	24	·30
6	S	17	·49	1	O	17	·02	2	N	15	·55	4	D	15●○	·08	64	5	Jr	13	·61		7	F	12	·14	1	Mr	12	·67
3	S	5	·86	5	O	5	·39	6	N	3	·92	1	D	3	·45	65	2	Jr	1	·98		4	Jr	31	·51	6	Mr	2	·04
2	S	24	·75	4	O	24○	·28	5	N	22	81	7	D	22	·34	66	1	Jr	20	·87		3	F	19	·40	4	Mr	20	·93
7	S	14	·12	1	O	13○	·65	3	N	12	·18	4	D	11	·71	67	6	Jr	10	·24		7	F	8	·77	2	Mr	10	·30
4	S	3	·49	6	O	3○	02	7	N	1	·55	2	D	1	·08		3	D	30	·61	68	5	Jr	29	·14	6	F	27	·67
3	S	21●	·38	4	O	20	·91	6	N	19	·44	7	D	18	·97	69	2	Jr	17	·50		4	F	16○	·03	5	Mr	17	·56
7	S	10	·75	2	O	10	·28	3	N	8	·81	5	D	8	·34	70	6	Jr	6	·87		1	F	5●○	·40	2	Mr	6	·93
6	S	29	·65	1	O	29	18	2	N	27	·71	4	D	27	·24	71	5	Jr	25	·77		7	F	24	·30	1	Mr	25	83
4	S	19	·02	5	O	18	·55	7	N	17	·08	1	D	16	61	72	3	Jr	15●	·14		4	F	13	·67	6	Mr	14	·20
1	S	7	·38	2	O	6	·91	4	N	5	·44	5	D	4○	·97	73	7	Jr	3	·50		2	F	2	03	3	Mr	3	·56
7	S	26	·28	1	O	25	·81	3	N	24○	·34	4	D	23	·87	74	6	Jr	22	·40		7	F	20	·93	2	Mr	22	·46
4	S	15	·65	6	O	15	·18	7	N	13○	71	2	D	13	·24	75	3	Jr	11	77		5	F	10	·30	6	Mr	11	·83
2	S	5	·01	3	O	4	·54	5	N	3	·07	6	D	2	·60	76	1	Jr	1	·13		2	Jr	30	·66	4	F	29	·19
7	S	22○	·91	2	O	22	·44	3	N	20	97	5	D	20	·50	77	7	Jr	19	·03		1	F	17	·56	3	Mr	19○	·09
5	S	12○	·28	6	O	11	·81	1	N	10	·34	2	D	9	·87	78	4	Jr	8	·40		5	F	6	·93	7	Mr	8●○	·46
{2	S	1○	·65	5	O	30	71	7	N	29	·24	1	D	28	·77	79	3	Jr	27	·30		4	F	25	83	6	Mr	27	·36
{4	O	1	·18																										
1	S	20	·54	3	O	20	·07	4	N	18	·61	6	D	18	·13	80	7	Jr	16○	·66		2	F	15●	·19	3	Mr	15	·72
5	S	8	·91	7	O	8	·44	1	N	6	·97	3	D	6	·50	81	5	Jr	5○	·03		6	F	3	·56	1	Mr	5	·09
4	S	27	·81	6	O	27	·34	7	N	25	·87	2	D	25○	·40	82	3	Jr	23	·93		5	F	22	·46	6	Mr	23	·99
2	S	17	·18	3	O	16	·71	5	N	15	·24	6	D	14●	·77	83	1	Jr	13	·30		2	F	11	·83	4	Mr	13	·36
6	S	6	55	1	O	6	·08	2	N	4○	·61	4	D	4●	14	84	5	Jr	2	·67		7	F	1	·20	1	Mr	1	·73
5	S	24	·44	6	O	23○	·97	1	N	22	·50	3	D	22	·03	85	4	Jr	20	·57		6	F	19	·10	7	Mr	20	·63
2	S	13	·81	4	O	13○	·34	5	N	11	·87	7	D	11	·40	86	1	Jr	9	·93		3	F	8	·46	4	Mr	9	·99
7	S	3	·18	1	O	2	·71	3	N	1	·24	4	N	30	·77		6	D	30	·30	87	7	Jr	28	·83	2	F	27○	·36
6	S	22●	·07	7	O	21	·61	2	N	20	14	3	D	19	·67	88	5	Jr	18	·20		6	F	16○	·73	1	Mr	17	·26
3	S	10	·44	4	O	9	·97	6	N	8	·50	1	D	8	·03	89	2	Jr	6	·56		4	F	5●	·09	5	Mr	6	·62
2	S	29	·34	3	O	28	·87	5	N	27	·40	6	D	26	·93	90	1	Jr	25	·46		2	F	23	·99	4	Mr	25	·52
6	S	18	·71	1	O	18	·24	2	N	16	·77	4	D	16○	·30	91	5	Jr	14	·83		7	F	13	·36	1	Mr	14	·89
4	S	8	·07	5	O	7	·60	7	N	6	·13	1	D	5○	·67	92	3	Jr	4	·20		4	F	2	·73	6	Mr	3	·26

(1) for Ārya siddhānta + ·04; (2) for Brahma siddhānta – ·09; and (3) for Siddhānta Śirōmaṇi – ·03.

TABLE II.—

			Commencement of solar year.					Vaiśākha.				Jyeshṭha.				Āshāḍha.				Śrāvaṇa.				Bhādrapada.			
Kaliyuga.	Vikrama era.	Śaka era.	Month and day A.D.	Fraction of day.	First new moon in solar year.	Anomaly of first new moon.	Christian era. A.D.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
4693	1649	1514	27M	·9234	4·8650	24·820	**1592**	7	Ap	1	·79	2	My	1	82	3 5	My Je	30○ 29	·85 ·38	6	Jl	28	·91	1	Au	27	44
4694	1650	1515	28M	·1822	23·5039	22·953	**1593**	6	Ap	20	·69	1	My	20●	·22	2	Je	18	·75	4	Jl	18	·28	5	Au	16	·81
4695	1651	1516	28M	·4409	12·6122	19·110	**1594**	4	Ap	10○	·05	5	My	9●	·58	7	Je	8	·11	1	Jl	7	·64	3	Au	6	·17
4696	1652	1517	28M	·6997	1·7205	15·268	**1595**	1	Mr	30○	·42	2 4	Ap My	28 28	·95 ·48	6	Je	27	·01	7	Jl	26	·54	2	Au	25	·07
4697	1653	1518	27M	·9584	20·3594	13·401	**1596**	7	Ap	17	·82	1	My	16	85	3	Je	15	·38	4	Jl	14	·91	6	Au	13	·44
4698	1654	1519	28M	·2172	9·4677	9·558	**1597**	4	Ap	6	·68	6	My	6	·21	7	Je	4	·75	2	Jl	4	·28	3	Au	2	·81
4699	1655	1520	28M	·4759	28·1066	7·691	**1598**	3	Ap	25	·58	5	My	25	·11	6	Je	23	64	1	Jl	23○	·17	2	Au	21	·70
4700	1656	1521	28M	·7347	17·2149	3·848	**1599**	7	Ap	14	95	2	My	14	·48	4	Je	13	01	5	Jl	12○	·54	7	Au	11	·07
4701	1657	1522	27M	·9935	6·3233	0·128	**1600**	5	Ap	3	·32	6	My	2	85	1	Je	1	38	2 4	Je Jl	30● 30	·91 ·44	5	Au	28	·97
4702	1658	1523	28M	·2522	24·9621	25·816	**1601**	4	Ap	22	·21	5	My	21○	·74	7	Je	20●	27	1	Je	19	·81	3	Au	18	·34
4703	1659	1524	28M	·5110	14·0704	21·973	**1602**	1	Ap	11	58	3	My	11○	11	4	Je	9	·64	6	Jl	9	·17	7	Au	7	·70
4704	1660	1525	28M	·7697	3·1787	18·130	**1603**	5	Mr	31	95	7	Ap	30●○	·48	2 3	My Je	30 28	·01 ·54	5	Jl	28	·07	6	Au	26	·60
4705	1661	1526	28M	·0285	21·8175	16·264	**1604**	4	Ap	18●	85	6	My	18	·88	7	Je	16	·91	2	Jl	16	·44	3	Au	14	·97
4706	1662	1527	28M	·2872	10·9258	12·421	**1605**	2	Ap	8●	·21	3	My	7	·74	5	Je	6	·27	6	Jl	5	·80	1	Au	4	·33
4707	1663	1528	28M	·5460	0·0341	8·578	**1606**	1	Ap	27	·11	2	My	26	·64	4	Je	25	·17	5	Jl	24	·70	7	Au	23○	·23
4708	1664	1529	28M	·8048	18·6730	6·711	**1607**	5	Ap	16	·48	7	My	16	·01	1	Je	14	·54	3	Jl	14	·07	4	Au	12○	·60
4709	1665	1530	28M	·0635	7·7813	2·868	**1608**	2	Ap	4	·84	4	My	4	37	5	Je	2	91	7	Jl	2○	·44	1 3	Jl Au	31 30	·97 ·50
4710	1666	1531	28M	·3223	26·4202	1·002	**1609**	1	Ap	23	·74	3	My	23	·27	4	Je	21○	·80	6	Jl	21	·33	7	Au	19	·86
4711	1667	1532	28M	·5810	15·5285	24·714	**1610**	6	Ap	13	·11	7	My	12	·64	2	Je	11●○	·17	3	Jl	10	·70	5	Au	9	·23
4712	1668	1533	28M	·8398	4·6368	20·871	**1611**	3	Ap	2	·48	5	My	2	·01	6 1	My Je	31 30	·54 ·07	2	Jl	29	·60	4	Au	28	·18
4713	1669	1534	28M	·0985	23·2757	19·004	**1612**	2	Ap	20○	·37	3	My	19●	90	5	Je	18	43	6	Jl	17	·97	1	Au	16	·50
4714	1670	1535	28M	·3573	12·3840	15·161	**1613**	6	Ap	9○	·74	1	My	9	·27	2	Je	7	80	4	Jl	7	·33	5	Au	5	·86
4715	1671	1536	28M	·6161	1·4923	11·319	**1614**	4	Mr	30○	·11	5 7	Ap My	28 28	·64 ·17	1	Je	26	70	3	Jl	26	·23	4	Au	24	·76
4716	1672	1537	28M	·8748	20·1312	9·452	**1615**	3	Ap	18	·01	4	My	17	·54	6	Je	16	·07	7	Jl	15	·60	2	Au	14	·13
4717	1673	1538	28M	·1336	9·2395	5·609	**1616**	7	Ap	6	·37	1	My	5	·90	3	Je	4	·43	4	Jl	3	·96	6	Au	2○	·49
4718	1674	1539	28M	·3923	27·8784	3·742	**1617**	6	Ap	25	·27	7	My	24	·80	2	Je	23	·33	3	Jl	22●○	·86	5	Au	21	·39
4719	1675	1540	28M	·6511	16·9867	27·454	**1618**	3	Ap	14	·64	5	My	14	·17	6	Je	12	·70	1	Jl	12	·23	2	Au	10	·76
4720	1676	1541	28M	·9098	6·0950	23·611	**1619**	1	Ap	4	·00	2	My	3	·53	4	Je	2○	07	5 7	Jl Jl	1● 31	60 13	1	Au	29	·66
4721	1677	1542	28M	·1686	24·7338	21·745	**1620**	6	Ap	21	·90	1	My	21○	·43	2	Je	19	·96	4	Jl	19	·49	6	Au	18	·02
4722	1678	1543	28M	·4274	13·8421	17·902	**1621**	4	Ap	11	·27	5	My	10●○	80	7	Je	9	·33	1	Jl	8	·86	3	Au	7	·39
4723	1679	1544	28M	·6861	2·9504	14·059	**1622**	1	Mr	31	·64	3	Ap	30	·17	4 6	My Je	29 28	·70 ·23	7	Jl	27	76	2	Au	26	·29
4724	1680	1545	28M	·9449	21·5893	12·192	**1623**	7	Ap	19	·53	2	My	19	·06	3	Je	17	·59	5	Jl	17	·13	6	Au	15	·66
4725	1681	1546	28M	·2036	10·6976	8·350	**1624**	4	Ap	7	·90	6	My	7	·43	7	Je	5	·96	2	Jl	5	·49	4	Au	4	·02
4726	1682	1547	28M	·4624	29·3365	6·483	**1625**	3	Ap	26	·80	5	My	26	·33	6	Je	24	·86	1	Jl	24	·39	2	Au	22○	·92
4727	1683	1548	28M	·7211	18·4448	2·640	**1626**	1	Ap	16	·17	2	My	15	·70	4	Je	14	·23	5	Jl	13	·76	7	Au	12	·29
4728	1684	1549	28M	·9799	7·5531	26·352	**1627**	5	Ap	5	53	7	My	5	·06	1	Je	3	·59	3 4	Jl Au	3○ 1●	·12 ·65	6	Au	31	·19
4729	1685	1550	28M	·2386	26·1920	24·485	**1628**	4	Ap	23	43	5	My	22	·96	7	Je	21○	·49	2	Jl	21	·02	3	Au	19	·55
4730	1686	1551	28M	·4974	15·3003	20·643	**1629**	1	Ap	12	·80	3	My	12	·33	4	Je	10●	·86	6	Jl	10	·39	7	Au	8	·92
4731	1687	1552	28M	·7562	4·4086	16·800	**1630**	6	Ap	2	·16	7	My	1○	·69	2 3	My Je	31 29	·23 ·76	5	Jl	29	·29	6	Au	27	·82
4732	1688	1553	29M	·0149	23·0475	14·933	**1631**	5	Ap	21○	·06	6	My	20●	·59	1	Je	19	·12	2	Jl	18	·65	4	Au	17	·18
4733	1689	1554	28M	·2737	12·1558	11·090	**1632**	2	Ap	9●○	·43	3	My	8	·96	5	Je	7	·49	7	Jl	7	·02	1	Au	5	·55
4734	1690	1555	28M	·5324	1·2641	7·248	**1633**	6 1	Mr Ap	29 28	·80 ·33	2	My	27	·86	4	Je	26	·39	5	Jl	25	·92	7	Au	24	·45
4735	1691	1556	28M	·7912	19·9030	5·381	**1634**	5	Ap	17	·69	7	My	17	·22	1	Je	15	·75	3	Jl	15	·29	4	Au	13○	·82
4736	1692	1557	29M	·0499	9·0113	1·538	**1635**	3	Ap	7	·06	4	My	6	·59	6	Je	5	·12	7	Jl	4	·65	2 3	Au S	3○ 1	·18 ·71
4737	1693	1558	28M	·3087	27·6502	27·226	**1636**	1	Ap	24	·96	3	My	24	·49	5	Je	23	·02	6	Jl	22●○	·55	1	Au	21	·08
4738	1694	1559	28M	·5675	16·7585	23·388	**1637**	6	Ap	14	·33	7	My	13	86	2	Je	12	·39	3	Jl	11	·92	5	Au	10	·45
4739	1695	1560	28M	·8262	5·8668	19·540	**1638**	3	Ap	3	·69	5	My	3	·22	6	Je	1○	·75	1 2	Jl Jl	1 30	·28 ·81	4	Au	29	·35
4740	1696	1561	29M	·0850	24·5056	17·674	**1639**	2	Ap	22	·59	4	My	22○	·12	5	Je	20	·65	7	Jl	20	·18	1	Au	18	·71
4741	1697	1562	28M	·3437	13·6139	13·831	**1640**	6	Ap	10	·96	1	My	10	·49	3	Je	9	·02	4	Jl	8	·55	6	Au	7	·08
4742	1698	1563	28M	·6025	2·7222	9·988	**1641**	4	Mr	31○	·32	5 7	Ap My	29 29	·85 ·39	1	Je	27	·92	3	Jl	27	·45	4	Au	25	·98
4743	1699	1564	28M	·8612	21·3611	8·121	**1642**	3	Ap	19	·22	4	My	18	·75	6	Je	17	·28	7	Jl	16	·81	2	Au	15	·34
4744	1700	1565	29M	·1200	10·4694	4·279	**1643**	7	Ap	8	·59	2	My	8	·12	3	Je	6	·65	5	Jl	6	·18	6	Au	4	·71
4745	1701	1566	28M	·3787	29·1083	2·412	**1644**	6	Ap	26	·49	1	My	26	·02	2	Je	24	·55	4	Jl	24	·08	5	Au	22●	·61
4746	1702	1567	28M	·6375	18·2166	26·124	**1645**	3	Ap	15	·85	5	My	15	·38	6	Je	13	·91	1	Jl	13○	·45	2	Au	11●	·98
4747	1703	1568	28M	·8963	7·3249	22·281	**1646**	1	Ap	5	·22	2	My	4	·75	4	Je	3	·28	5 7	Jl Au	2○ 1	·81 ·34	1	Au	30	·87

N.B.—For tithis by other siddhāntas add to the above algebraically as follows:—

Sūrya siddhānta—*cont.*

Āśvina. Week-day.	Month.	Day.	Fraction.	Kārttika. Week-day.	Month	Day.	Fraction.	Mārgaśirsha. Week-day.	Month.	Day.	Fraction.	Pausha. Week-day.	Month	Day.	Fraction.	A.D.	Māgha. Week-day.	Month.	Day	Fraction.	A.D.	Phālguna. Week-day.	Month.	Day	Fraction.	Chaitra. Week-day.	Month.	Day.	Fraction.
2	S	25	·97	4	O	25	50	6	N	24○	·08	7	D	23	·56	**93**	2	Jr	22	·09		3	F	20	·62	5	Mr	22	·15
7	S	15	·34	1	O	14	·87	3	N	13●	·40	4	D	12	·93	**94**	6	Jr	11	·46		7	F	9	·99	2	Mr	11	·52
4	S	4	·71	6	O	4○	·24	7	N	2	77	2	D	2	·30		3	D	31	·83	**95**	5	Jr	30	·36	6	F	28	·89
3	S	28●○	60	5	O	28	·13	6	N	21	66	1	D	21	·19	**96**	2	Jr	19	·73		4	F	18	·26	5	Mr	18○	·79
7	S	11●○	·97	2	O	11	·50	4	N	10	·03	5	D	9	·56	**97**	7	Jr	8	·09		1	F	6	·62	3	Mr	8●	·15
{5	S	1	·34	1	O	30	·40	2	N	28	·93	4	D	28	·46	**98**	5	Jr	26○	·99		7	F	25	·52	2	Mr	27	·05
{6	S	30	87																										
4	S	20	·23	5	O	19	·77	7	N	18	30	1	D	17	·88	**99**	3	Jr	16○	·36		4	F	14●	·89	6	Mr	16	·42
1	S	9	60	8	O	9	·18	4	N	7	66	6	D	7	·19	**16**	7	Jr	5○	·72	**00**	2	F	4	·25	3	Mr	4	·79
7	S	27	·60	2	O	27	·03	3	N	25	·56	5	D	25●	·09	**01**	6	Jr	23	·62		1	F	22	15	2	Mr	23	·68
4	S	16	·87	6	O	16	·40	7	N	14○	·93	2	D	14	46	**02**	3	Jr	12	·99		5	F	11	·52	7	Mr	18	·05
2	S	6	·23	3	O	5	·76	5	N	4○	·29	6	D	3	·83	**03**	1	Jr	2	·36		2	Jr	31	·89	4	Mr	2	42
1	S	25	·13	2	O	24○	66	4	N	23	·19	5	D	22	·72	**04**	7	Jr	21	·25		1	F	19	·78	3	Mr	20	·31
5	S	13	·50	7	O	13	·03	1	N	11	·56	3	D	11	·09	**05**	4	Jr	9	·62		6	F	8	·15	7	Mr	9○	·68
2	S	2○	·87	4	O	2	·40	5	O	31	·93	7	N	30	·46		1	D	29	99	**06**	3	Jr	28	·52	{5	F	27	·05
																										{6	Mr	28	·58
1	S	21	76	3	O	21	·29	4	N	19	·82	6	D	19	·35	**07**	7	Jr	17	·89		2	F	16●	·42	3	Mr	17	·95
6	S	11	·13	7	O	10	66	2	N	9	·19	3	D	8	·72	**08**	5	Jr	7	·25		6	F	5●	·78	1	Mr	6	·31
5	S	29	·03	6	O	28	·56	1	N	27	09	2	D	26○	62	**09**	4	Jr	25	·15		5	F	23	·68	7	Mr	25	·21
2	S	18	·39	3	O	17	·93	5	N	16	·46	6	D	15●○	·99	**10**	1	Jr	14	·52		3	F	13	·05	4	Mr	14	·58
6	S	7	·76	1	O	7	·29	2	N	5	82	4	D	5●○	35	**11**	5	Jr	3	·88		7	F	2	41	1	Mr	3	·95
5	S	26	66	7	O	26	19	1	N	24●	·72	3	D	24	·25	**12**	4	Jr	22	·78		6	F	21	·31	7	Mr	21	·84
3	S	15	·03	4	O	14○	·56	6	N	13	·09	7	D	12	62	**13**	2	Jr	11	·15		3	F	9	·68	5	Mr	11	21
7	S	4	·39	1	O	3○	·92	3	N	2	·45	4	D	1	·99		6	D	31	52	**14**	1	Jr	30	·05	2	F	28	·58
6	S	23●○	·29	7	O	22	·82	2	N	21	35	3	D	20	·88	**15**	5	Jr	19	·41		6	F	17	·94	1	Mr	19●	·47
3	S	12	·66	5	O	12	19	6	N	10	·72	1	D	10	25	**16**	2	Jr	8	·78		4	F	7○	·31	5	Mr	7	·84
{1	S	1●	·08	4	O	30	·09	5	N	28	·62	7	D	28	15	**17**	1	Jr	26○	68		3	F	25	21	4	Mr	26	·74
{2	S	30	·56																										
6	S	19	·92	1	O	19	·45	2	N	17	·98	4	D	17	·51	**18**	6	Jr	16○	·05		7	F	14	·58	2	Mr	16	·11
4	S	9	·29	5	O	8	·82	7	N	7	35	1	D	6	·88	**19**	3	Jr	5	41		4	F	3	·94	6	Mr	5	·47
3	S	28	·19	4	O	27	72	6	N	26○	·25	7	D	25	·78	**20**	2	Jr	24	·31		3	F	22	·84	5	Mr	23	·37
7	S	16	·55	2	O	16	·09	3	N	14○	·62	5	D	14	15	**21**	6	Jr	12	·68		1	F	11	·21	2	Mr	12	74
4	S	5	·92	6	O	5	·45	7	N	3○	98	2	D	3	51	**22**	4	Jr	2	·04		5	Jr	31	·57	7	Mr	2	·11
3	S	24	·82	5	O	24●	·35	6	N	22	·88	1	D	22	41	**23**	2	Jr	20	·94		4	F	19	·47	6	Mr	21○	·00
1	S	14○	·19	2	O	13	·72	4	N	12	·25	5	D	11	·78	**24**	7	Jr	10	·31		1	F	8	84	3	Mr	9●○	.87
5	S	2○	55	7	O	2	08	1	O	31	61	3	N	30	·15		4	D	29	·68	**25**	6	Jr	28	·21	{7	F	26○	·74
																										{2	Mr	28	·27
4	S	21	·45	5	O	20	·98	7	N	19	·51	2	D	19	04	**26**	3	Jr	17	·57		5	F	16●	·10	6	Mr	17	·66
1	S	10	·82	3	O	10	35	4	N	8	·88	6	D	8	·41	**27**	7	Jr	6○	·94		2	F	5	·47	4	Mr	7	·00
7	S	29	·72	2	O	29	·25	3	N	27	·78	5	D	27○	·31	**28**	6	Jr	25	·84		1	F	24	·37	2	Mr	24	·90
5	S	18	·08	6	O	17	·61	1	N	16	·14	2	D	15○	67	**29**	4	Jr	14	·21		5	F	12	·74	7	Mr	14	·27
2	S	7	·45	3	O	6	·98	5	N	5	·51	7	D	5	·04	**30**	1	Jr	3	·57		3	F	2	·10	4	Mr	3	·63
1	S	26	·35	2	O	25○	·88	4	N	24●	·41	5	D	23	94	**31**	7	Jr	22	47		2	F	21	·00	3	Mr	22	·53
5	S	15	·71	7	O	15●○	·25	1	N	13	·78	3	D	13	·31	**32**	4	Jr	11	·84		6	F	10	·37	7	Mr	10	·90
3	S	4	·08	4	O	3○	·61	6	N	2	·14	7	D	1	·67		2	D	31	·20	**33**	3	Jr	29	·73	5	F	28	27
1	S	22●	·98	3	O	22	·51	5	N	21	·04	6	D	20	·57	**34**	1	Jr	19	·10		2	F	17○	·63	4	Mr	19●	·16
6	S	12	·35	7	O	11	·88	2	N	10	·41	3	D	9	·94	**35**	5	Jr	8	·47		7	F	7○	·00	1	Mr	8	·53
5	O	1	·24	6	O	30	·77	1	N	29	·31	2	D	28	·84	**36**	4	Jr	27○	·37		5	F	25	·90	7	Mr	26	·43
2	S	19	·61	4	O	19	·14	5	N	17	·67	7	D	17	·20	**37**	1	Jr	15●	·73		3	F	14	26	4	Mr	15	79
6	S	8	·98	1	O	8	·51	3	N	7	·04	4	D	6○	·57	**38**	6	Jr	5●	·10		7	F	3	·63	2	Mr	5	·16
5	S	27	·88	7	O	27	·41	1	N	25○	·94	3	D	25	·47	**39**	5	Jr	24	·00		6	F	22	·53	1	Mr	24	·06
3	S	17	·24	4	O	16	·77	6	N	15○	·30	7	D	14	83	**40**	2	Jr	13	·37		3	F	11	·90	5	Mr	12	·43
7	S	5	·61	2	O	5	·14	3	N	3	·67	5	D	3	·20	**41**	6	Jr	1	73		1	Jr	31	·26	2	Mr	1	·79
6	S	24○	·51	1	O	24●	·04	2	N	22	·57	4	D	22	10	**42**	5	Jr	20	·63		7	F	19	·16	1	Mr	20○	·69
3	S	13○	·87	5	O	13	·41	6	N	11	·94	1	D	11	47	**43**	3	Jr	10	·00		4	F	8	·53	6	Mr	10●○	·06
1	S	3●○	·24	2	O	2	·77	4	N	1	·30	5	N	30	·83		7	D	30	·36	**44**	1	Jr	28	89	{3	F	27	·43
																										{4	Mr	27	·96
7	S	21	·14	1	O	20	·67	3	N	19	·20	4	D	18	·73	**45**	6	Jr	17○	·26		7	F	15	·79	2	Mr	17	·32
4	S	10	·51	6	O	10	·04	7	N	8	·57	2	D	8	·10	**46**	3	Jr	6○	·63		5	F	5	·16	6	Mr	6	·66
3	S	29	·40	4	O	28	·93	6	N	27	·47	1	D	27○	·00	**47**	2	Jr	25	·53		4	F	24	·06	5	Mr	25	·59

(1) for Ārya siddhānta + ·05; (2) for Brahma siddhānta − ·10; and for Siddhānta Śirōmaṇi − ·03.

TABLE II.—

Kalyuga.	Vikrama era.	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new moon in solar year	Anomaly of first new moon	Christian era.	Vaiśākha. Week-day.	Month.	Day.	Fraction.	Jyeshṭha. Week-day.	Month.	Day.	Fraction.	Āshāḍha. Week-day	Month.	Day.	Fraction.	Śrāvaṇa. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day.	Month.	Day.	Fraction.
							A.D.																				
4748	1704	1569	29M	·1550	25·9638	20·414	**1647**	7	Ap	24	·12	1	My	23	·65	3	Je	22●	·18	4	Jl	21	·71	6	Au	20	·24
4749	1705	1570	28M	·4138	15·0721	16·571	**1648**	4	Ap	12	·49	6	My	12○	·02	7	Je	10●	·55	2	Jl	10	·08	3	Au	8	·61
4750	1706	1571	28M	·6725	4·1804	12·729	**1649**	1	Ap	1	·85	3	My	1○	38	4 6	My Je	30 29	·91 44	7	Jl	28	·97	2	Au	27	·51
4751	1707	1572	28M	·9813	22·8193	10·862	**1650**	7	Ap	20○	·75	2	My	20	·28	3	Je	18	·81	5	Jl	18	·84	6	Au	16	·87
4752	1708	1573	29M	·1900	11·9276	7·019	**1651**	5	Ap	10	·12	6	My	9	·65	1	Je	8	·18	2	Jl	7	·71	4	Au	6	·24
4753	1709	1574	28M	·4488	1·0359	3·176	**1652**	2 4	Mr Ap	29● 28	48 ·01	5	My	27	·55	7	Je	26	08	1	Jl	25	·61	3	Au	24○	·14
4754	1710	1575	28M	·7076	19·6748	1·310	**1653**	1	Ap	17	38	2	My	16	·91	4	Je	15	·44	5	Jl	14	·97	7	Au	13○	·50
4755	1711	1576	28M	·9668	8·7831	25·022	**1654**	5	Ap	6	75	7	My	6	·28	1	Je	4	81	3	Jl	4	·34	4 6	Au S	2●○ 1	·87 40
4756	1712	1577	29M	·2251	27·4220	28·155	**1655**	4	Ap	25	65	6	My	25	·18	7	Je	23	·71	2	Jl	23●	·24	3	Au	21	·77
4757	1713	1578	28M	4838	16·5808	19·812	**1656**	2	Ap	14	01	3	My	13	·54	5	Je	12○	·07	6	Jl	11	·61	1	Au	10	·14
4758	1714	1579	28M	·7426	5·6386	15·469	**1657**	6	Ap	3	·38	7	My	2	·91	2	Je	1●○	44	3 5	Je Jl	30 30	·97 ·50	7	Au	29	·03
4759	1715	1580	29M	·0013	24·2774	13·603	**1658**	5	Ap	22	·28	6	My	21●	·81	1	Je	20	·84	2	Jl	19	·87	4	Au	18	·40
4760	1716	1581	29M	·2601	13·3857	9·760	**1659**	2	Ap	11○	·65	4	My	11●	·18	5	Je	9	·71	7	Jl	9	·24	1	Au	7	·77
4761	1717	1582	28M	·5189	2·4940	5·917	**1660**	7	Mr	31○	·01	1 3	Ap My	29 29	·54 07	4	Je	27	60	6	Jl	27	·13	7	Au	25	·67
4762	1718	1583	28M	·7776	21·1329	4·050	**1661**	5	Ap	18	·91	7	My	18	·44	1	Je	16	·97	3	Jl	16	·50	5	Au	15	·03
4763	1719	1584	29M	·0364	10·2412	0·208	**1662**	3	Ap	8	·28	4	My	7	·81	6	Je	6	·34	7	Jl	5	·87	2	Au	4	·40
4764	1720	1585	29M	·2951	28·8801	25·895	**1663**	2	Ap	27	·17	3	My	26	·71	5	Je	25	·24	6	Jl	24○	·77	1	Au	23	·30
4765	1721	1586	28M	·5539	17·9884	22·053	**1664**	6	Ap	15	·54	1	My	15	·07	2	Je	13	·60	4	Jl	13○	·13	5	Au	11	·66
4766	1722	1587	28M	8126	7·0967	18·210	**1665**	3	Ap	4	91	5	My	4	·44	6	Je	2	·97	1 3	Jl Au	2 1	·50 ·03	4	Au	30	·56
4767	1723	1588	29M	·0714	25·7356	16·343	**1666**	2	Ap	23	·81	4	My	23○	·34	5	Je	21●	·87	7	Jl	21	·40	1	Au	19	·93
4768	1724	1589	29M	3301	14·8439	12·500	**1667**	7	Ap	13	·17	1	My	12○	·70	3	Je	11●	·23	4	Jl	10	·77	6	Au	9	·30
4769	1725	1590	28M	·5889	3·9522	8·658	**1668**	4	Ap	1	·54	6	My	1○	·07	7 2	My Je	30 29	·60 ·13	3	Jl	28	·66	5	Au	27	·19
4770	1726	1591	28M	·8477	22·5911	6·791	**1669**	3	Ap	20●	·44	4	My	19	·97	6	Je	18	·50	1	Jl	18	·03	2	Au	16	·56
4771	1727	1592	29M	·1064	11·6994	2·948	**1670**	7	Ap	9	·81	2	My	9	·34	3	Je	7	·87	5	Jl	7	·40	6	Au	5	·93
4772	1728	1593	29M	3652	0·8077	26·660	**1671**	5 6	Mr Ap	30 28	·17 ·70	1	My	28	·23	2	Je	26	·76	4	Jl	26	·29	5	Au	24●○	·83
4773	1729	1594	28M	·6239	19·4466	24·793	**1672**	4	Ap	17	·07	5	My	16	60	7	Je	15	·13	1	Jl	14	·66	3	Au	13○	·19
4774	1730	1595	28M	·8827	8·5549	20·951	**1673**	1	Ap	6	·44	2	My	5	·97	4	Je	4	·50	6	Jl	4	·03	7 2	Au S	2● 1	·56 ·09
4775	1731	1596	29M	·1414	27·1937	19·084	**1674**	7	Ap	25	·33	1	My	24	·87	3	Je	23○	·40	4	Jl	22●	·93	6	Au	21	·46
4776	1732	1597	29M	·4002	16·3020	15·241	**1675**	4	Ap	14	·70	6	My	14	·23	7	Je	12●○	·76	2	Jl	12	·29	3	Au	10	·82
4777	1733	1598	28M	·6590	5·4103	11·398	**1676**	2	Ap	3	·07	3	My	2	·60	5	Je	1●	·13	6 1	Je Jl	30 30	·66 ·19	2	Au	28	·72
4778	1734	1599	28M	·9177	24·0492	9·531	**1677**	7	Ap	21○	·97	2	My	21●	·50	4	Je	20	·03	5	Jl	19	·56	7	Au	18	·09
4779	1735	1600	29M	·1765	13·1575	5·629	**1678**	5	Ap	11○	·33	6	My	10	·86	1	Je	9	·39	2	Jl	8	·93	4	Au	7	·46
4780	1736	1601	29M	·4352	2·2658	1·846	**1679**	2	Mr	31○	70	4 5	Ap My	30 29	·23 ·76	7	Je	28	·29	1	Jl	27	·82	3	Au	26	·35
4781	1737	1602	28M	·6940	20·9047	27·534	**1680**	1	Ap	18	·60	3	My	18	·13	4	Je	16	·66	6	Jl	16	·19	7	Au	14	·72
4782	1738	1603	28M	·9527	10·0130	23·691	**1681**	5	Ap	7	·97	7	My	7	·50	2	Je	6	·03	3	Jl	5	·56	5	Au	4○	·09
4783	1739	1604	29M	·2115	28·6519	21·824	**1682**	4	Ap	26	·86	6	My	26	·39	7	Je	24	·92	2	Jl	24○	·45	3	Au	22	·99
4784	1740	1605	29M	·4703	17·7602	17·982	**1683**	2	Ap	16	·23	3	My	15	·76	5	Je	14	·29	6	Jl	13●○	·82	1	Au	12	·35
4785	1741	1606	28M	·7290	6·8685	14·139	**1684**	6	Ap	4	·60	1	My	4	·13	2	Je	2○	·66	4 5	Jl Jl	2 31	·19 ·72	7	Au	30	·25
4786	1742	1607	28M	·9878	25·5074	12·272	**1685**	5	Ap	23	·49	7	My	23○	03	1	Je	21	·56	3	Jl	21	·09	4	Au	19	·62
4787	1743	1608	29M	·2465	14·6157	8·429	**1686**	2	Ap	12	·86	4	My	12●○	·39	5	Je	10	·92	7	Jl	10	·45	1	Au	8	·98
4788	1744	1609	29M	5053	3·7240	4·587	**1687**	7	Ap	2	·23	1	My	1●	·76	3 4	My Je	31 29	·29 ·82	6	Jl	29	·35	7	Au	27	·88
4789	1745	1610	28M	·7640	22·8629	2·720	**1688**	6	Ap	20●	·13	7	My	19	·66	2	Je	18	·19	3	Jl	17	·72	5	Au	16	·25
4790	1746	1611	29M	·0228	11·4712	26·432	**1689**	3	Ap	9	·49	5	My	9	02	6	Je	7	·55	1	Jl	7	·09	2	Au	5	·62
4791	1747	1612	29M	·2815	0·5795	22·589	**1690**	7 2	Mr Ap	29 28	·86 ·39	3	My	27	·92	5	Je	26	·45	6	Jl	25	·98	1	Au	24●○	·51
4792	1748	1613	29M	5403	19·2184	20·722	**1691**	6	Ap	17	·76	1	My	17	·29	2	Je	15	·82	4	Jl	15	·35	5	Au	13	·88
4793	1749	1614	28M	·7991	8·3267	16·880	**1692**	4	Ap	6	·18	5	My	5	·66	7	Je	4	·19	1	Jl	3○	·72	3 4	Au Au	2 31	·25 ·78
4794	1750	1615	29M	·0578	26·9655	15·013	**1693**	3	Ap	25	02	4	My	24	·55	6	Je	23●○	·08	7	Jl	22	·61	2	Au	21	·15
4795	1751	1616	29M	·3166	16·0738	11·170	**1694**	7	Ap	14	·39	1	My	13	·92	3	Je	12○	·45	4	Jl	11	·98	6	Au	10	·51
4796	1752	1617	29M	·5753	5·1821	7·327	**1695**	4	Ap	3	·76	6	My	3○	·29	7 2	Je Jl	1 1	·82 35	3	Jl	30	·88	5	Au	29	·41
4797	1753	1618	28M	·8341	23·8210	5·461	**1696**	3	Ap	21○	·65	5	My	21	·19	6	Je	19	·72	1	Jl	19	·25	2	Au	17	·78
4798	1754	1619	29M	·0928	12·9293	1·618	**1697**	1	Ap	11●○	·02	2	My	10	·55	4	Je	9	·08	5	Jl	8	·61	7	Au	7	·14
4799	1755	1620	29M	3516	2·0370	25·330	**1698**	5	Mr	31	·39	6 1	Ap My	29 29	·92 ·45	2	Je	27	·98	4	Jl	27	·51	6	Au	26	·04
4800	1756	1621	29M	·6104	20·6765	23·468	**1699**	4	Ap	19	·29	5	My	18	·82	7	Je	17	·35	1	Jl	16	·88	3	Au	15○	·41

N.B.—For tithis by other siddhāntas add to the above algebraically as follows:—

Sūrya siddhānta—*cont.*

Āśvina.				Kārttika.				Mārgaśīrsha.				Pausha.				A.D.	Māgha.				A.D.	Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
7	S	18	·77	2	O	18	·30	3	N	16	·83	5	D	16●	·36	**48**	6	Jr	14	·89		1	F	13	42	2	Mr	13	·95
5	S	7	·14	6	O	6	·67	1	N	5○	·20	2	D	4	·73	**49**	4	Jr	8	·26		5	F	1	·79	7	Mr	8	·32
4	S	26	·04	5	O	25○	·57	7	N	24	10	1	D	23	63	**50**	8	Jr	22	·16		4	F	20	·69	6	Mr	22	·22
1	S	15	·40	2	O	14●○	·93	4	N	13	·46	5	D	12	·99	**51**	7	Jr	11	·53		2	F	10	·06	3	Mr	11	·59
5	S	4	·77	7	O	4	·30	1	N	2	·83	3	D	2	·86		4	D	31	·89	**52**	6	Jr	30	·42	7	F	28○	·95
4	S	22	·67	6	O	22	·20	7	N	20	·73	2	D	20	·26	**53**	3	Jr	18	·79		5	F	17○	·32	6	Mr	18●	·85
2	S	12	·03	3	O	11	·57	5	N	10	·10	6	D	9	·63	**54**	1	Jr	8	·16		2	F	6●○	·69	4	Mr	8	·22
7	S	30	·93	2	O	30	·46	3	N	28	·99	5	D	28	·52	**55**	7	Jr	27●	·05		1	F	25	·59	3	Mr	27	·12
5	S	20	·30	6	O	19	·83	1	N	18	·36	2	D	17○	·89	**56**	4	Jr	16	·42		5	F	14	·95	7	Mr	15	·48
2	S	8	·67	4	O	8	·20	5	N	6	·73	7	D	6○	·26	**57**	1	Jr	4	·79		8	F	3	·32	4	Mr	4	·85
1	S	27	·56	3	O	27	·09	4	N	25○	·63	6	D	25'	16	**58**	7	Jr	23	·69		2	F	22	·22	3	Mr	23	·75
5	S	16	·93	7	O	16	·46	1	N	14	·99	3	D	14	·52	**59**	5	Jr	13	05		6	F	11	·58	1	Mr	13	·11
3	S	6	·30	4	O	5○	·83	6	N	4	·36	7	D	3	·89	**60**	2	Jr	2	·42		3	Jr	31	·95	5	Mr	1	·48
2	S	24○	·20	3	O	23	·73	5	N	22	·26	6	D	21	·79	**61**	1	Jr	20	·32		2	F	18	·85	4	Mr	20●○	38
6	S	13○	·56	1	O	13	·09	2	N	11	·62	4	D	11	15	**62**	5	Jr	9	69		7	F	8	22	1	Mr	9●	·75
3	S	2●	·93	5	O	2	·46	6	O	31	·99	1	N	30	·52		3	D	30	·05	**63**	4	Jr	28○	·58	{6 7	F Mr	27 28	·11 ·64
2	S	21	·83	4	O	21	86	5	N	19	·89	7	D	19	·42	**64**	1	Jr	17●○	95		3	F	16	48	5	Mr	17	·01
7	S	10	·19	1	O	9	·73	3	N	8	·26	4	D	7	·79	**65**	6	Jr	6●○	32		7	F	4	·85	2	Mr	6	·38
6	S	29	·09	7	O	28	·62	2	N	27	·15	3	D	26●	·68	**66**	5	Jr	25	21		6	F	23	75	1	Mr	25	·28
3	S	18	·46	4	O	17	·99	6	N	16○	·52	1	D	16	·05	**67**	2	Jr	14	·58		4	F	13	·11	5	Mr	14	·64
7	S	7	·88	2	O	7	·86	3	N	5○	·89	5	D	5	·42	**68**	6	Jr	3	95		1	F	2	·48	8	Mr	3	·01
6	S	25	·72	1	O	25○	·25	2	N	23	·79	4	D	23	·32	**69**	5	Jr	21	85		7	F	20	·88	1	Mr	21	·91
4	S	15	·09	5	O	14	·62	7	N	13	·15	1	D	12	·68	**70**	3	Jr	11	·21		4	F	9	·74	6	Mr	11○	·27
1	S	4○	·46	2	O'	3	·99	4	N	2	·52	6	D	2	·05		7	D	31	·58	**71**	2	Jr	30	·11	3	F	28○	·64
7	S	23	·36	1	O	22	·89	8	N	21	·42	4	D	20	·95	**72**	6	Jr	19	48		1	F	18○	·01	2	Mr	18	·54
4	S	11	·72	6	O	11	·25	7	N	9	·78	2	D	9	·31	**73**	3	Jr	7	85		5	F	6	·38	6	Mr	7	·91
3	S	30	·62	5	O	30	·15	6	N	28	·68	1	D	28○	·21	**74**	2	Jr	26	·74		4	F	25	27	5	Mr	26	·80
7	S	19	·99	2	O	19	·52	4	N	18	·05	5	D	17○	·58	**75**	7	Jr	16	11		1	F	14	·64	3	Mr	16	·17
5	S	9	·35	6	O	8	·89	1	N	7	·42	2	D	6○	·95	**76**	4	7r	5	48		6	F	4	·01	7	Mr	4	·54
4	S	27	·25	5	O	26	·78	7	N	25●	·31	1	D	24	·84	**77**	8	Jr	23	37		4	F	21	·91	6	Mr	28	·44
1	S	16	·62	3	O	16○	·15	4	N	14	·68	6	D	14	·21	**78**	7	Jr	12	74		2	F	11	27	8	Mr	12	·80
5	S	5	·99	7	O	5○	·52	2	N	4	·05	3	D	3	·58	**79**	5	Jr	2	·11		6	Jr	31	·64	1	Mr	2	·17
4	S	24○	·88	6	O	24	·41	7	N	22	·95	2	D	22	·48	**80**	4	Jr	21	01		5	F	19	·54	7	Mr	20●	·07
2	S	13	·25	3	O	12	·78	5	N	11	·31	6	D	10	·84	**81**	1	Jr	9	87		2	F	7○	·90	4	Mr	9	·43
{6 1	S O	2● 2	·62 ·15	2	O	31	·68	4	N	30	·21	**Pausha Kshaya**					5	D	29	74	**82**	7	Jr	28○	27	{1 8	F Mr	26 28	·80 ·33
5	S	21	·52	7	O	21	·05	1	N	19	·58	3	D	19	·11	**83**	4	Jr	17○	64		6	F	16	·17	7	Mr	17	·70
2	S	10	·88	4	O	10	·41	5	N	8	·94	7	D	8	·47	**84**	2	Jr	7	01		3	F	5	·54	5	Mr	6	·07
1	S	28	·78	3	O	28	·31	4	N	26○	·84	6	D	26	·37	**85**	7	Jr	24	90		2	F	23	·43	3	Mr	24	·96
6	S	18	·15	7	O	17	·68	2	N	16●○	·21	3	D	15	·74	**86**	5	Jr	14	·27		6	F	12	80	1	Mr	14	·83
3	S	7	·51	5	O	7	·05	6	N	5○	·58	1	D	5	·11	**87**	2	Jr	8	·64		4	F	2	·17	5	Mr	8	·70
2	S	26	·41	3	O	25●	·94	5	N	24	·47	7	D	24	·00	**88**	1	Jr	22	53		3	F	21	·07	4	Mr	21○	60
6	S	14○	·78	1	O	14	·31	2	N	12	·84	4	D	12	·37	**89**	5	Jr	10	90		7	F	9	·43	1	Mr	10○	·96
4	S	4○	·15	5	O	3	·68	7	N	2	·21	1	D	1	·74		3	D	31	27	**90**	4	Jr	29	·80	6	F	28○	·38
8	S	23	·04	4	O	22	·57	6	N	21	·11	7	D	20	·64	**91**	2	Jr	19	17		3	F	17●	·70	5	Mr	19	·23
7	S	12	·41	1	O	11	·94	3	N	10	·47	5	D	10	·00	**92**	6	Jr	8○	·53		1	F	7●	·06	2	Mr	7	·59
6	S	30	·31	7	O	29	·84	2	N	28	·37	3	D	27●	·90	**93**	5	Jr	26	48		6	F	24	·96	1	Mr	26	·49
3	S	19	·68	5	O	19	·21	6	N	17	·74	1·	D	17●	·27	**94**	2	Jr	15	·80		4	F	14	·33	5	Mr	15	·86
1	S	9	·04	2	O	8	·57	4	N	7	·10	5	D	6	·68	**95**	7	Jr	5	·17		1	F	8	·70	3	Mr	5	·23
6	S	27	·94	1	O	27○	·47	3	N	26●	·00	4	D	25	·53	**96**	6	Jr	24	06		7	F	22	·59	2	Mr	23	·12
4	S	16	·31	5	O	15○	·84	7	N	14	·37	1	D	13	·90	**97**	3	Jr	12	48		4	F	10	·96	6	Mr	12	·49
1	S	5	·67	3	O	5●○	·21	4	N	3	·74	6	D	3	·27	**98**	7	Jr	1	·80		2	Jr	31	33	3	Mr	1	·86
7	S	24●	·57	2	O	24	·10	3	N	22	·63	5	D	22	·16	**99**	6	Jr	20	·69		1	F	19○	·23	2	Mr	20●	·76
4	S	13●	·94	6	O	13	·47	1	N	12	·00	2	D	11	·53	**17**	4	Jr	10	·06	**00**	5	F	8○	59	7	Mr	9	·12

(1) for Ārya siddhānta + ·05; (2) for Brahma siddhānta — ·10; and (3) for Siddhānta Śirômaṇi — ·03.

TABLE II.—

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year: Month and day A.D	Commencement of solar year: Fraction of day.	First new moon in solar year.	Anomaly of first new moon	Christian era.	Vaiśākha.				Jyeshṭha.				Āshāḍha.				Śrāvaṇa.				Bhādrapada.			
							A.D.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month	Day	Fraction.	Week-day	Month.	Day.	Fraction.	Week-day.	Month	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
4801	1757	1622	28M	·8691	9·7848	19·623	**1700**	1	Ap	7	65	3	My	7	·18	4	Je	5	·71	6	Jl	5	·24	7	Au	3○	·78
4802	1758	1623	29M	·1279	28·4237	17·756	**1701**	7	Ap	26	·55	2	My	26	08	3	Je	24	·61	5	Jl	24●○	·14	6	Au	22	·67
4803	1759	1624	29M	·3866	17·5320	18·913	**1702**	4	Ap	15	92	6	My	15	45	7	Je	13	·98	2	Jl	13	·51	4	Au	12	·04
4804	1760	1625	29M	·6454	6·6403	10·071	**1703**	2	Ap	5	28	3	My	4	·82	5	Je	3○	·35	6 1	Jl Au	2 1	·88 ·41	2	Au	30	94
4805	1761	1626	28M	·9041	25·2792	8·204	**1704**	1	Ap	23	·18	2	My	22○	71	4	Je	21	24	5	Jl	20	·77	7	Au	19	·31
4806	1762	1627	29M	·1629	14·3875	4·361	**1705**	5	Ap	12	·55	7	My	12	·08	1	Je	10	·61	3	Jl	10	14	4	Au	8	·67
4807	1763	1628	29M	·4217	3·4958	0·518	**1706**	2	Ap	1○	·92	4 5	My My	1● 30	·45 ·98	7	Je	29	·51	2	Jl	29	04	3	Au	27	·57
4808	1764	1629	29M	6804	22·1847	26·206	**1707**	1	Ap	20●	·81	3	My	20	·35	4	Je	18	88	6	Jl	18	·41	7	Au	16	94
4809	1765	1630	28M	·9392	11·2430	22·363	**1708**	6	Ap	9	18	7	My	8	71	2	Je	7	24	3	Jl	6	77	5	Au	5	·30
4810	1766	1631	29M	·1979	0·3513	18·521	**1709**	3 5	Mr Ap	29 28	·55 ·08	6	My	27	·61	1	Je	26	14	2	Jl	25	67	4	Au	24●	·20
4811	1767	1632	29M	·4567	18·9902	16·654	**1710**	2	Ap	17	·45	3	My	16	·98	5	Je	15	51	7	Jl	15○	04	1	Au	13	·57
4812	1768	1633	29M	·7154	8·0984	12·811	**1711**	6	Ap	6	·81	1	My	6	·34	2	Je	4	87	4	Jl	4○	40	5 7	Au S	2 1	94 47
4813	1769	1634	28M	9742	26·7373	10·944	**1712**	5	Ap	24	71	7	My	24	24	1	Je	22●○	77	3	Jl	22	·30	4	Au	20	83
4814	1770	1635	29M	·2329	15·8456	7·102	**1713**	3	Ap	14	·08	4	My	18○	61	6	Je	12	14	7	Jl	11	·67	2	Au	10	20
4815	1771	1636	29M	4917	4·9539	3·259	**1714**	7	Ap	3	·45	1	My	2○	98	3 5	Je Jl	1 1	·51 ·04	6	Jl	30	57	1	Au	29	10
4816	1772	1637	29M	·7505	23·5928	1·392	**1715**	6	Ap	22●○	·34	7	My	21	87	2	Je	20	40	3	Jl	19	·93	5	Au	18	·47
4817	1773	1638	29M	0092	12·7011	25·104	**1716**	3	Ap	10●	71	5	My	10	24	6	Je	8	·77	1	Jl	8	·30	2	Au	6	·83
4818	1774	1639	29M	2680	1·8094	21·261	**1717**	1	Mr	31	·08	2 4	Ap My	29 29	61 ·14	5	Je	27	67	7	Jl	27	·20	1	Au	25○	73
4819	1775	1640	29M	·5267	20·4483	19·395	**1718**	6	Ap	18	·97	1	My	18	51	3	Je	17	04	4	Jl	16	·57	6	Au	15○	·10
4820	1776	1641	29M	7855	9·5566	15·552	**1719**	4	Ap	8	34	5	My	7	·87	7	Je	6	·40	1	Jl	5	·93	3	Au	4○	46
4821	1777	1642	29M	·0442	28·1955	13·685	**1720**	3	Ap	26	·24	4	My	25	·77	6	Je	24	30	7	Jl	28●	·83	2	Au	22	·36
4822	1778	1643	29M	3030	17·3028	9·842	**1721**	7	Ap	15	·61	2	My	15	·14	3	Je	13○	·67	5	Jl	13●	·20	6	Au	11	·73
4823	1779	1644	29M	5618	6·4121	6·000	**1722**	4	Ap	4	·97	6	My	4	·50	1	Je	3○	03	2 4	Jl Au	2 1	·57 ·10	5	Au	30	63
4824	1780	1645	29M	·8205	25·0510	4·133	**1723**	3	Ap	23	87	5	My	23●	40	6	Je	21	·93	1	Jl	21	·46	2	Au	19	99
4825	1781	1646	29M	0798	14·1593	0·290	**1724**	1	Ap	12○	·24	2	My	11	77	4	Je	10	30	5	Jl	9	88	7	Au	8	36
4826	1782	1647	29M	·3380	3·2676	24·002	**1725**	5	Ap	1○	61	7 1	My My	1 30	·14 67	3	Je	29	·20	4	Jl	28	·73	6	Au	27	·26
4827	1783	1648	29M	·5968	21·9065	22·135	**1726**	4	Ap	20	·50	6	My	20	·03	7	Je	18	·56	2	Jl	18	·09	3	Au	16	·63
4828	1784	1649	29M	·8555	11·0148	18·292	**1727**	1	Ap	9	·87	3	My	9	40	4	Je	7	98	6	Jl	7	·46	7	Au	5	99
4829	1785	1650	29M	·1143	0·1281	14·450	**1728**	6 7	Mr Ap	29 27	24 ·77	2	My	27	80	3	Je	25	·83	5	Jl	25○	·36	6	Au	23●	·89
4830	1786	1651	29M	·3731	18·7619	12·588	**1729**	5	Ap	17	13	6	My	16	66	1	Je	15	·20	2	Jl	14○	·73	4	Au	13	26
4831	1787	1652	29M	·6318	7·8702	8·743	**1730**	2	Ap	6	·50	4	My	6	·03	5	Je	4	56	7	Jl	4●○	09	1 3	Au S	2 1	62 15
4832	1788	1653	29M	·8906	26·5091	6·878	**1731**	1	Ap	25	40	2	My	24○	93	4	Je	23●	46	5	Jl	22	99	7	Au	21	·52
4833	1789	1654	29M	·1493	15·6174	3·031	**1732**	5	Ap	13	·77	7	My	13○	30	1	Je	11	·83	3	Jl	11	36	4	Au	9	·89
4834	1790	1655	29M	·4081	4·7257	26·742	**1733**	3	Ap	3	·13	4	My	2○	66	6 7	Je Je	1 30	·19 ·72	2	Jl	30	·26	3	Au	28	·79
4835	1791	1656	29M	·6668	23·3646	24·876	**1734**	2	Ap	22●	·03	3	My	21	56	5	Je	20	09	6	Jl	19	62	1	Au	18	15
4836	1792	1657	29M	·9256	12·4729	21·033	**1735**	6	Ap	11	·40	7	My	10	·93	2	Je	9	·46	3	Jl	8	99	5	Au	7	·52
4837	1793	1658	29M	·1843	1·5812	17·190	**1736**	3	Mr	30	·76	5 6	Ap My	29 28	·30 ·83	1	Je	27	·36	2	Jl	26	·89	4	Au	25○	·42
4838	1794	1659	29M	4431	20·2201	15·323	**1737**	2	Ap	18	·66	4	My	18	·19	5	Je	16	·72	7	Jl	16	·25	1	Au	14●○	78
4839	1795	1660	29M	·7019	9·3284	11·481	**1738**	7	Ap	8	·03	1	My	7	·56	3	Je	6	·09	4	Jl	5	·62	6	Au	4●	·15
4840	1796	1661	29M	9606	27·9673	9·614	**1739**	5	Ap	26	·93	7	My	26	·46	1	Je	24○	·99	3	Jl	24	52	5	Au	23	05
4841	1797	1662	29M	·2194	17·0756	5·771	**1740**	3	Ap	15	29	4	My	14	·82	6	Je	13○	·36	7	Jl	12	89	2	Au	11	42
4842	1798	1663	29M	4781	6·1839	1·929	**1741**	7	Ap	4	·66	2	My	4	·19	3	Je	2●	·72	5 6	Jl Jl	2 31	·25 ·78	1	Au	30	31
4843	1799	1664	29M	·7369	24·8228	0·062	**1742**	6	Ap	23○	·56	1	My	23●	·09	2	Je	21	·62	4	Jl	21	·15	5	Au	19	·68
4844	1800	1665	29M	·9956	13·9311	23·774	**1743**	3	Ap	12○	·93	5	My	12	·46	6	Je	10	·99	1	Jl	10	·52	3	Au	9	·05
4845	1801	1666	29M	·2544	3·0394	19·931	**1744**	1	Ap	1○	·29	2	Ap	30	·82	4 5	My Je	30 28	·35 88	7	Jl	28	·42	1	Au	26	·95
4846	1802	1667	29M	·5132	21·6783	18·064	**1745**	7	Ap	20	·19	1	My	19	·72	3	Je	18	·25	4	Jl	17	·78	6	Au	16	·31
4847	1803	1668	29M	·7719	10·7866	14·221	**1746**	4	Ap	9	·56	6	My	9	·09	7	Je	7	·62	2	Jl	7	15	3	Au	5○	·68
4848	1804	1669	30M	·0307	29·4254	12·355	**1747**	3	Ap	28	46	4	My	27	·99	6	Je	26	·52	1	Jl	26○	·05	2	Au	24●	·58
4849	1805	1670	29M	·2894	18·5337	8·512	**1748**	7	Ap	6	·82	2	My	16	·35	3	Je	14	·88	5	Jl	14●○	·41	6	Au	12	·94
4850	1806	1671	29M	·5482	7·6420	4·669	**1749**	5	Ap	6	·19	6	My	5	·72	1	Je	4○	·25	2	Jl	3	·78	4 5	Au Au	2 31	·31 ·84
4851	1807	1672	29M	·8069	26·2809	2·802	**1750**	4	Ap	25	·09	5	My	24○	62	7	Je	23	·15	1	Jl	22	·68	3	Au	21	·21
4852	1808	1673	30M	·0657	15·3892	26·514	**1751**	1	Ap	14	·45	2	My	13●○	·98	4	Je	12	·52	6	Jl	12	·05	7	Au	10	·58

N.B.—For tithis by other siddhāntas add to the above algebraically as follows :—

Sûrya siddhânta—*cont.*

Āśvina.				**Kārttika.**				**Mārgaśirsha.**				**Pausha.**				**A.D**	**Māgha.**				**A.D.**	**Phālguna.**				**Chaitra.**			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day	Fraction.	Week-day	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction		Week-day.	Month	Day.	Fraction	Week-day	Month.	Day.	Fraction
2 3	S O	2 1	·31 84	5	O	31	37	6	N	29	·90	1	D	29	·43	**01**	2	Jr	27○	·96		4	F	26	·49	6	Mr	28	·02
1	S	21	·20	2	O	20	·73	4	N	19	26	5	D	18	·80	**02**	7	Jr	17●	·33		1	F	15	·86	3	Mr	17	·89
5	S	10	57	7	O	10	·10	1	N	8	63	3	D	8○	·16	**03**	4	Jr	6●	·69		6	F	5	·22	7	Mr	6	·75
4	S	29	·47	6	O	29	00	7	N	27○	·58	2	D	27	·06	**04**	3	Jr	25	·59		5	F	24	·12	6	Mr	24	·65
1	S	17	84	3	O	17	37	4	N	15●○	·90	6	D	15	·43	**05**	7	Jr	13	·96		2	F	12	·49	4	Mr	14	·02
6	S	7	·20	7	O	6	·73	2	N	5	26	3	D	4	·79	**06**	5	Jr	3	·32		6	F	1	·86	1	Mr	3	·89
5	S	26○	·10	6	O	25	63	1	N	24	·16	2	D	23	69	**07**	4	Jr	22	·22		5	F	20	75	7	Mr	22○	·28
2	S	15○	·47	4	O	15	·00	5	N	13	53	7	D	13	·06	**08**	1	Jr	11	·59		3	F	10	12	4	Mr	10●○	·65
6	S	3●○	83	1	O	3	·86	2	N	1	90	4	D	1	·43		5	D	30	·96	**09**	7	Jr	29	·49	2	F	28●	·02
5	S	22	73	7	O	22	26	1	N	20	79	3	D	20	·32	**10**	4	Jr	18○	85		6	F	17	·39	7	Mr	18	·92
3	S	12	10	4	O	11	63	6	N	10	16	7	D	9	·69	**11**	2	Jr	8○	·22		3	F	6	75	5	Mr	8	·28
2	O	1	00	3	O	30	53	5	N	29	06	6	D	28●○	·59	**12**	1	Jr	27	12		2	F	25	65	4	Mr	26	·18
6	S	19	36	7	O	18	·89	2	N	17	43	3	D	16●	·96	**13**	5	Jr	15	·49		7	F	14	02	1	Mr	15	·55
3	S	8	73	5	O	8	26	6	N	6○	79	1	D	6	·32	**14**	2	Jr	4	·85		4	F	3	38	5	Mr	4	91
2	S	27	63	4	O	27○	·16	5	N	25	·69	7	D	25	22	**15**	1	Jr	23	·75		3	F	22	·28	4	Mr	23	·81
7	S	17	00	1	O	16○	53	3	N	15	·06	4	D	14	·59	**16**	6	Jr	13	·12		7	F	11	·65	2	Mr	12	18
4	S	5	·36	5	O	4●	89	7	N	3	·42	1	D	2	·95	**17**	3	Jr	1	·40		5	Jr	31	·02	6	Mr	1○	·55
3	S	24	26	4	O	23	79	6	N	22	·32	7	D	21	·85	**18**	2	Jr	20	·38		3	F	18○	·91	5	Mr	20	·44
7	S	13●	63	2	O	13	·16	3	N	11	·69	5	D	11	22	**19**	6	Jr	9	75		1	F	8●○	·28	2	Mr	9	81
4 6	S O	2 2	99 53	1	N	1	06	2	N	30	·59	4	D	30	·12	**20**	5	Jr	28●	·65		7	F	27	·18	1	Mr	27	·71
3	S	20	89	5	O	20	·42	6	N	18	·95	1	D	18○	·48	**21**	3	Jr	17	01		4	F	15	·55	6	Mr	17	·08
1	S	10	26	2	O	9	79	4	N	8	·32	5	D	7○	85	**22**	7	Jr	6	·38		1	F	4	·91	3	Mr	6	·44
7	S	29	16	1	O	28	69	3	N	27○	22	4	D	26	·75	**23**	6	Jr	25	·28		7	F	23	·81	2	Mr	25	34
4	S	18	52	6	O	18	·05	7	N	16	·59	2	D	16	·12	**24**	3	Jr	14	·65		5	F	13	·18	6	Mr	13	·71
1	S	6	89	3	O	6○	·42	4	N	4	·95	6	D	4	·48	**25**	1	Jr	3	01		2	F	1	·54	4	Mr	3	·07
7	S	25○	79	2	O	25	32	3	N	23	·85	5	D	23	·38	**26**	6	Jr	21	·91		1	F	20	·44	2	Mr	21○	97
5	S	15○	16	6	O	14	·69	1	N	13	·22	2	D	12	·75	**27**	4	Jr	11	28		5	F	9	·81	7	Mr	11	·34
2	S	4●	·52	4	O	4	05	5	N	2	·58	7	D	2	11		1	D	31	·64	**28**	3	Jr	30○	·18	4	F	28	·71
1	S	22	42	2	O	21	·95	4	N	20	48	6	D	20	·01	**29**	7	Jr	18○	·54		2	F	17	·07	3	Mr	18	·60
5	S	11	·79	7	O	11	32	1	N	9	·85	3	D	9	·38	**30**	4	Jr	7○	·91		6	F	6	·44	7	Mr	7	·97
4	S	30	68	6	O	30	·22	7	N	28	·75	2	D	28●	·28	**31**	3	Jr	26	·81		5	F	25	·34	6	Mr	26	87
2	S	20	05	3	O	19	58	5	N	18○	·11	6	D	17●	·64	**32**	1	Jr	16	·17		2	F	14	·70	4	Mr	15	·24
6	S	8	·42	7	O	7	95	2	N	6○	·48	4	D	6	·01	**33**	5	Jr	4	·54		7	F	3	07	1	Mr	4	·60
5	S	27	·32	6	O	26○	85	1	N	25	·38	2	D	24	91	**34**	4	Jr	23	·44		5	F	21	·97	7	Mr	23	·50
2	S	16	·68	4	O	16	·21	5	N	14	74	7	D	14	·28	**35**	1	Jr	12	·81		3	F	11	·84	4	Mr	12○	·87
7	S	6○	·05	1	O	5●	58	3	N	4	·11	4	D	3	·64	**36**	6	Jr	2	·17		7	Jr	31	·70	2	Mr	1○	·28
5	S	23	·95	7	O	23	·48	2	N	22	·01	3	D	21	·54	**37**	5	Jr	20	·07		6	F	18○	·60	1	Mr	20	·13
3	S	13	32	4	O	12	·85	6	N	11	38	7	D	10	·91	**38**	2	Jr	9	41		3	F	7	·97	5	Mr	9	·30
7 2	S O	2 2	·68 ·21	3	O	31	74	5	N	30	·27	6	D	29○	80	**39**	1	Jr	28	34		2	F	26	·87	4	Mr	28	·40
6	S	21	·58	1	O	21	·11	2	N	19	·64	4	D	19●○	·17	**40**	5	Jr	17	70		7	F	16	·23	1	Mr	16	·76
3	S	9	·95	5	O	9	·18	7	N	8	·01	1	D	7○	54	**41**	3	Jr	6	07		4	F	4	60	6	Mr	6	·13
2	S	28	·84	4	O	28	·38	5	N	26●	·91	7	D	26	·44	**42**	1	Jr	24	97		3	F	23	50	5	Mr	25	03
7	S	18	·21	1	O	17○	·74	3	N	16	·27	4	D	15	80	**43**	6	Jr	14	33		7	F	12	86	2	Mr	14	40
4	S	7	·58	6	O	7○	·11	7	N	5	64	2	D	5	·17	**44**	3	Jr	3	70		5	F	2	·23	6	Mr	2	76
3	S	25●○	48	5	O	25	·01	6	N	23	·54	1	D	23	·07	**45**	2	Jr	21	60		4	F	20	·13	5	Mr	21●	66
7	S	14	84	2	O	14	37	3	N	12	·91	5	D	12	44	**46**	6	Jr	10	·97		1	F	9○	50	3	Mr	11●	03
5	S	4	21	6	O	3	·74	1	N	2	·27	2	D	1	80		4	D	31	33	**47**	5	Jr	29○	86	7 1	F Mr	28 29	·39 92
4	S	23	11	5	O	22	·64	7	N	21	17	1	D	20	·70	**48**	3	Jr	19○	23		4	F	17	76	6	Mr	18	29
1	S	11	·48	3	O	11	·01	4	N	9	54	6	D	9	07	**49**	7	Jr	7	60		2	F	6	13	3	Mr	7	66
7	S	30	·37	1	O	29	90	3	N	28○	·43	4	D	27●	·96	**50**	6	Jr	26	·50		1	F	25	03	2	Mr	26	·56
4	S	19	74	6	O	19	·27	7	N	17○	·80	2	D	17	33	**51**	3	Jr	15	86		5	F	14	·39	6	Mr	15	·92
2	S	9	·11	3	O	8	64	5	N	7○	·17	6	D	6	·70	**52**	1	Jr	5	23		2	F	3	·76	4	Mr	4	29

(1) for Ârya siddhânta + ·05 ; (2) for Brahma siddhânta - ·10 ; and (3) for Siddhânta Siromaṇi -- ·03.

TABLE II.—

Kaliyuga	Vikrama era	Śaka era	Commencement of solar year: Month and day A.D.	Commencement of solar year: Fraction of day	First new moon in solar year	Anomaly of first new moon	Christian era A.D.	Vaiśākha: Week-day	Month	Day	Fraction	Jyeshṭha: Week-day	Month	Day	Fraction	Āshāḍha: Week-day	Month	Day	Fraction	Śrāvaṇa: Week-day	Month	Day	Fraction	Bhādrapada: Week-day	Month	Day	Fraction
4853	1809	1674	29M	·3244	4·4975	22·671	**1752**	5	Ap	2	·82	7	My	2	·35	1 3	My Je	31 30	·68 ·41	4	Jl	29	·94	6	Au	28	·47
4854	1810	1675	9A	·5832	23·1364	20·805	**1753**	4	My	2●	·72	6	Je	1	·25	7	Je	30	·78	2	Jl	30	·31	3	Au	28	·84
4855	1811	1676	9A	·8420	12·2447	16·962	**1754**	2	Ap	22	·09	3	My	21	·62	5	Je	20	·15	6	Jl	19	·68	1	Au	18	·21
4856	1812	1677	10A	·1007	1·3530	13·119	**1755**	6	Ap	11	·45	7 2	My Je	10 9	·98 ·51	4	Jl	9	·04	5	Au	7	58	7	S	6●○	·11
4857	1813	1678	9A	·3595	19·9919	11·252	**1756**	5	Ap	29	·85	6	My	28	·88	1	Je	27	41	2	Jl	26	·94	4	Au	25	·47
4858	1814	1679	9A	·6182	9·1002	7·410	**1757**	2	Ap	18	72	4	My	18	·25	5	Je	16	·78	7	Jl	16○	·31	1	Au	14	·84
4859	1815	1680	9A	·8770	27·7391	5·548	**1758**	1	My	7	·62	3	Je	6	·15	4	Jl	5○	·68	6	Au	4	·21	7	S	2	·74
4860	1816	1681	10A	·1357	16·8474	1·700	**1759**	5	Ap	26	98	7	My	26	51	2	Je	25	·04	3	Jl	24	·57	5	Au	23	·10
4861	1817	1682	9A	·3945	5·9557	25·412	**1760**	3	Ap	15	35	4	My	14○	·88	6	Je	13●	·41	7 2	Jl Au	12 11	·94 ·47	4	S	10	·00
4862	1818	1683	9A	·6533	24·5946	23·545	**1761**	2	My	4○	·25	3	Je	2●	78	5	Jl	2	31	6	Jl	31	·84	1	Au	30	37
4863	1819	1684	9A	9120	13·7029	19·703	**1762**	6	Ap	23●○	·61	1	My	23	14	2	Je	21	68	4	Jl	21	·21	5	Au	19	74
4864	1820	1685	10A	·1708	2·8112	15·860	**1763**	3	Ap	12●	·98	5 7	My Je	12 11	·51 ·04	1	Jl	10	57	3	Au	9	·10	4	S	7	·68
4865	1821	1686	9A	·4295	21·4500	13·993	**1764**	2	Ap	30	·88	4	My	30	·41	5	Je	28	·94	7	Jl	28	·47	2	Au	27○	·00
4866	1822	1687	9A	·6883	10·5588	10·150	**1765**	7	Ap	20	·25	1	My	19	·78	3	Je	18	·31	4	Jl	17	·84	6	Au	16○	·37
4867	1823	1688	9A	9470	29·1972	8·284	**1766**	6	My	9	·14	7	Je	7	·67	2	Jl	7	·20	3	Au	5○	·74	5	S	4	·27
4868	1824	1689	10A	·2058	18·3055	4·441	**1767**	3	Ap	28	·51	5	My	28	·04	6	Je	26	·57	1	Jl	26	10	2	Au	24	·63
4869	1825	1690	9A	·4646	7·4138	0·598	**1768**	7	Ap	16	·88	2	My	16	·41	3	Je	14○	·94	5 7	Jl Au	14● 13	·47 ·00	1	S	11	·53
4870	1826	1691	9A	·7233	26·0527	26·286	**1769**	6	My	5	·78	1	Je	4●○	31	2	Jl	3	84	4	Au	2	·37	5	Au	31	·90
4871	1827	1692	9A	·9821	15·1610	22·443	**1770**	4	Ap	25	·14	5	My	24●	·67	7	Je	23	·20	1	Jl	22	·73	3	Au	21	26
4872	1828	1693	10A	2408	4·2693	18·600	**1771**	1	Ap	14○	·51	3	My	14	·04	4 6	Je Jl	12 12	·57 10	7	Au	10	·63	2	S	9	·16
4873	1829	1694	9A	·4996	22·9082	16·734	**1772**	7	My	2	·41	1	My	31	·94	3	Je	30	47	5	Jl	30	00	6	Au	28	·53
4874	1830	1695	9A	7583	12·0165	12·891	**1773**	4	Ap	21	·77	6	My	21	·30	7	Je	19	·84	2	Jl	19	·37	3	Au	17	·90
4875	1831	1696	10A	·0171	1·1248	9·048	**1774**	2 3	Ap My	11 10	14 67	5	Je	9	·20	6	Jl	8	·73	1	Au	7	·26	2	S	5●	·79
4876	1832	1697	10A	·2758	19·7637	7·181	**1775**	1	Ap	30	·04	2	My	29	·57	4	Je	28	·10	5	Jl	27○	·63	7	Au	26●	·16
4877	1833	1698	9A	·5346	8·8720	3·339	**1776**	5	Ap	18	41	6	My	17	·94	1	Je	16	·47	3	Jl	16○	·00	4 6	Au S	14 13	·53 06
4878	1834	1699	9A	·7934	27·5199	1·472	**1777**	4	My	7	·30	5	Je	5	·83	7	Jl	5●○	36	1	Au	3	·90	3	S	2	·43
4879	1835	1700	10A	·0521	16·6182	25·184	**1778**	1	Ap	26	·67	3	My	26	·20	4	Je	24	·73	6	Jl	24	·26	7	Au	22	·79
4880	1836	1701	10A	3109	5·7275	21·341	**1779**	6	Ap	16	·04	7	My	15○	·57	2	Je	14	·10	3 5	Jl Au	13 12	63 ·16	6	S	10	·69
4881	1837	1702	9A	·5696	24·3664	19·474	**1780**	4	My	3○	·94	6	Je	2	47	1	Jl	2	·00	2	Jl	31	·53	4	Au	30	·06
4882	1838	1703	9A	·8284	13·4747	15·632	**1781**	2	Ap	23	·30	3	My	22	·83	5	Je	21	·36	6	Jl	20	·89	1	Au	19	·42
4883	1839	1704	10A	·0871	2·5830	11·789	**1782**	6	Ap	12	·67	1 2	My Je	12 10	·20 ·73	4	Jl	10	·26	5	Au	8	·79	7	S	7○	·32
4884	1840	1705	10A	·3459	21·2218	9·922	**1783**	5	My	1	57	7	My	31	·10	1	Je	29	·63	3	Jl	29	·16	4	Au	27○	·69
4885	1841	1706	9A	·6047	10·3301	6·079	**1784**	2	Ap	19	·98	4	My	19	·46	6	Je	18	·00	7	Jl	17	·53	2	Au	16●○	06
4886	1842	1707	9A	·8634	28·9690	4·213	**1785**	1	My	8	·83	3	Je	7	·36	4	Jl	6	·89	6	Au	5●	·42	7	S	3	·95
4887	1843	1708	10A	·1222	18·0773	0·370	**1786**	6	Ap	28	·20	7	My	27	·73	2	Je	26○	·26	3	Jl	25	·79	5	Au	24	·32
4888	1844	1709	10A	·3809	7·1656	24·082	**1787**	3	Ap	17	·57	5	My	17	·10	6	Jl	15○	·63	1 2	Jl Au	15 13	·16 ·69	4	S	12	·22
4889	1845	1710	9A	·6397	25·8245	22·215	**1788**	2	My	5	·46	3	Je	3●	·99	5	Jl	3	·52	7	Au	2	·06	1	Au	31	·59
4890	1846	1711	9A	8984	14·9328	18·372	**1789**	6	Ap	24○	·83	1	My	24	·36	2	Je	22	·89	4	Jl	22	·42	5	Au	20	·95
4891	1847	1712	10A	·1572	4·0411	14·529	**1790**	4	Ap	14○	·20	5	My	13	·73	7 1	Je Jl	12 11	·26 ·79	3	Au	10	·32	4	S	8	·85
4892	1848	1713	10A	4160	22·6800	2·663	**1791**	3	My	3	·10	4	Je	1	·63	6	Jl	1	·16	7	Jl	30	·69	2	Au	29	·22
4893	1849	1714	9A	·6747	11·7883	8·820	**1792**	[illegible]	Ap	21	·46	1	My	20	·99	3	Je	19	·52	5	Jl	19	·05	6	Au	17	·58
4894	1850	1715	9A	·9335	0·8966	4·977	**1793**	4 6	Ap My	10 10	·83 ·36	7	Je	8	·89	2	Jl	8	·42	3	Au	6○	·95	5	S	5●	·48
4895	1851	1716	10A	·1922	19·5355	3·110	**1794**	3	Ap	29	·73	5	My	29	·26	6	Je	27	·79	1	Jl	27○	·32	2	Au	25●	·85
4896	1852	1717	10A	·4510	8·6438	26·822	**1795**	1	Ap	19	·09	2	My	18	·62	4	Je	17	·16	5	Jl	16●○	·69	7 1	Au S	15 13	·22 ·75
4897	1853	1718	9A	·7097	27·2827	24·955	**1796**	6	My	6	·99	1	Je	5	·52	3	Jl	5●	·05	4	Au	3	·58	6	S	2	·11
4898	1854	1719	9A	·9685	16·3910	21·113	**1797**	4	Ap	26	·36	5	M	25○	·89	7	Je	24	·42	1	Jl	23	·95	3	Au	22	·48
4899	1855	1720	10A	·2272	5·4993	17·270	**1798**	1	Ap	15	·73	3	My	15○	·26	4	Je	13	·79	6 7	Jl Au	13 11	·32 85	2	S	10	·38
4900	1856	1721	10A	·4860	24·1382	15·403	**1799**	7	My	4●	·62	2	Je	3	·15	3	Jl	2	·68	5	Au	1	·22	6	Au	30	·75
4901	1857	1722	10A	·7448	13·2464	11·563	**1800**	4	Ap	23●	·99	6	My	23	·52	1	Je	22	·05	2	Jl	21	·58	4	Au	20	·11
4902	1858	1723	11A	·0035	2·3548	7·720	**1801**	2	Ap	13●	·36	3 5	My Je	12 11	·89 ·42	6	Jl	10	·95	1	Au	9	·48	3	S	8○	·01
4903	1859	1724	11A	·2623	20·9936	5·854	**1802**	1	My	2	·26	2	My	31	·79	4	Je	30	·32	5	Jl	29	·85	7	Au	28●○	·38
4904	1860	1725	11A	·5210	10·1019	2·011	**1803**	5	Ap	21	·62	7	My	21	·15	1	Je	19	·68	3	Jl	19	·21	4	Au	17●	·74
4905	1861	1726	10A	·7798	28·7408	0·144	**1804**	4	My	9	·52	6	Je	8	·05	7	Jl	7○	·58	2	Au	6	·11	3	S	4	·64

N.B.—For tithis by other siddhāntas add to the above algebraically as follows:—(1) for Ārya siddhānta +·05; (2) for Brahma siddhānta —·10; and (3) for Siddhānta Śirômaṇi —·04.

Sūrya siddhānta—*cont.*

Āśvina				Kārttika				Mārgaśīrsha				A.D.	Pausha				A.D.	Māgha				Phālguna				Chaitra			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
1	O*	8	·00	2	N	6●	·54	4	D	6	·07	53	5	Jr	4	·60		7	F	3	·13	1	Mr	4	·66	3	Ap	8○	·19
5	S	27○	·37	6	O	26●	·90	1	N	25	·48		2	D	24	·96	54	4	Jr	23	·49	6	F	22	·02	7	Mr	23○	·56
2	S	16○	·74	4	O	16	27	5	N	14	80		7	D	14	·83	55	1	Jr	12	·86	3	F	11	·39	4	Mr	12○	·92
1	O	5	64	3	N	4	17	4	D	3	·70	56	6	Jr	2	23		7	Jr	31	76	2	Mr	1●	·29	3	Mr	30	·82
6	S	24	·00	7	O	23	·53	2	N	22	·06		3	D	21	·60	57	5	Jr	20○	·13	6	F	18	·66	1	Mr	20	·19
{3 4	S O	13 12	·37 ·90	6	N	11	·48	7	D	10	·96	58	2	Jr	9○	·49		4	F	8	·02	5	Mr	9	·55	7	Ap	8	·08
2	O	2	27	3	O	31	·80	5	N	30	·83		6	D	29●○	·86	59	1	Jr	28	·39	2	F	26	·92	4	Mr	28	45
6	S	21	·64	1	O	21	·17	2	N	19	70		4	D	19	·23	60	5	Jr	17	·76	7	F	16	·29	1	Mr	16	·82
5	O	9	·53	7	N	8○	·06	1	D	7	·59	61	3	Jr	6	·12		4	F	4	·66	6	Mr	6	·19	7	Ap	4	·72
2	S	28	·90	4	O	28○	·43	5	N	26	96		7	D	26	·49	62	2	Jr	25	·02	3	F	23	55	5	Mr	25	·08
7	S	18	·27	1	O	17●○	80	3	N	16	·33		4	D	15	·86	63	6	Jr	14	·39	7	F	12	92	2	Mr	14	·45
6	O	7●	·16	7	N	5	·70	2	D	5	·23	64	3	Jr	3	·76		5	F	2	·29	6	Mr	2○	82	1	Ap	1●	·35
3	S	25	·53	5	O	25	·08	6	N	23	·59		1	D	23	12	65	2	Jr	21	·65	4	F	20○	·18	5	Mr	21	·72
7	S	14	·90	2	O	14	43	3	N	12	·96		5	D	12	·49	66	7	Jr	11	·02	1	F	9●○	55	{3 4	Mr Ap	11 9	·08 ·61
6	O	3	·80	1	N	2	·33	2	D	1	·86		4	D	31	·39	67	5	Jr	29●	92	7	F	28	45	1	Mr	29	·98
4	S	23	·16	5	O	22	·69	7	N	21	·22		1	D	20○	·76	68	3	Jr	19	29	4	F	17	82	6	Mr	18	·85
3	O	11	·06	4	N	9	·59	6	D	9○	·12	61	7	Jr	7●	·65		2	F	6	·18	3	Mr	17	71	5	Ap	6	·24
7	S	30	·43	1	O	29	·96	3	N	28○	·49		5	D	28	·02	70	6	Jr	26	·55	1	F	25	·08	2	Mr	26	·61
4	S	19	·80	6	O	19	·33	7	N	17●	·86		2	D	17	·39	71	3	Jr	15	92	5	F	14	·45	6	Mr	15	·98
3	O	8○	·69	5	N	7	·22	6	D	6	·75	72	1	Jr	5	·28		2	F	3	·82	4	Mr	4	·35	5	Ap	2○	·88
1	S	27○	·06	2	O	26●	·59	4	N	25	·12		5	D	24	·65	73	7	Jr	23	·18	1	F	21	·71	3	Mr	23●○	24
5	S	16○	·43	6	O	15	·96	1	N	14	·49		3	D	14	·02	74	4	Jr	12	·55	6	F	11	08	7	Mr	12●	·61
4	O	5	·82	5	N	3	·86	7	D	3	·39	75	1	Jr	1	·92		3	Jr	31○	·45	4	Mr	1	98	6	Mr	31	·51
1	S	24	·69	3	O	24	·22	4	N	22	·75		6	D	22	·28	76	7	Jr	20●○	81	2	F	19	·34	3	Mr	19	·88
7	O	12	·59	2	N	11	·12	3	D	10	·65	77	5	Jr	9○	·18		6	F	7	·71	1	Mr	9	·24	2	Ap	7	·77
4	O	1	·96	6	O	31	·49	1	N	30	·02		2	D	29	·55	78	4	Jr	28	08	5	F	26	·61	7	Mr	28	·14
2	S	21	·32	3	O	20	·85	5	N	19○	·38		6	D	18	·92	79	1	Jr	17	·45	2	F	15	98	4	Mr	17	·51
1	O	10	22	2	N	80	·75	4	D	8	·28	80	5	Jr	6	·81		7	F	5	·34	1	Mr	5	·87	3	Ap	4	·40
5	S	28	·59	7	O	28○	·12	1	N	26	·65		3	D	26	·18	81	4	Jr	24	·71	6	F	23	·24	7	Mr	24	·77
2	S	17	96	4	O	17●	·49	6	N	16	02		7	D	15	55	82	2	Jr	14	·08	3	F	12	·61	5	Mr	14○	·14
1	O	6●	·85	3	N	5	·88	4	D	4	·91	83	6	Jr	3	·44		7	F	1	·98	2	Mr	3○	·51	4	Ap	2	·04
6	S	26	22	7	O	25	·75	2	N	24	·28		3	D	23	·81	84	5	Jr	22	·34	6	F	20○	·87	1	Mr	21	·40
3	S	14	·59	5	O	14	·12	6	N	12	·65		1	D	12	·18	85	2	Jr	10	·71	4	F	9●	·24	{5 7	Mr Ap	10 9	·77 ·30
2	O	3	·48	4	N	2	·02	5	D	1	55		7	D	31○	·08	86	1	Jr	29●	·61	3	F	28	·14	4	Mr	29	·67
6	S	22	85	1	O	22	38	2	N	20	91		4	D	20○	·44	87	5	Jr	18	·97	7	F	17	·50	2	Mr	19	·04
5	O	11	·75	7	N	10	·28	1	D	9○	·81	88	3	Jr	8	84		4	F	6	·87	6	Mr	7	·40	7	Ap	5	·93
3	S	30	·12	4	O	29	·65	6	N	28	·18		7	D	27	·71	89	2	Jr	26	·24	3	F	24	·77	5	Mr	26	·30
7	S	19	·48	2	O	19○	·01	3	N	17●	·54		5	D	17	·08	90	6	Jr	15	·61	1	F	14	·14	2	Mr	15	·67
6	O	8○	·88	7	N	6	·91	2	D	6	·44	91	3	Jr	4	·97		5	F	3	·50	7	Mr	5	·03	1	Ap	3●○	·56
3	S	27●○	·75	5	O	27	·28	6	N	25	·81		1	D	25	34	92	2	Jr	23	·87	4	F	22	·40	5	Mr	22	·93
1	S	16●	·12	2	O	15	·65	4	N	14	·18		5	D	13	·71	93	7	Jr	12	·24	1	F	10○	·77	3	Mr	12●	·30
7	O	5	·01	1	N	3	·54	3	D	3	·07	94	4	Jr	1	·60		6	Jr	31○	·14	7	Mr	1	67	2	Mr	31	·20
4	S	24	·38	5	O	23	·91	7	N	22	·44		1	D	21	·97	95	3	Jr	20●○	·50	5	F	19	·03	6	Mr	20	·56
3	O	13	·28	4	N	11	·81	6	D	11	·34	96	7	Jr	9●	87		2	F	8	·40	3	Mr	8	·93	5	Ap	7	·46
7	O	1	·64	2	O	31	·18	3	N	29○	·71		5	D	29	·24	97	6	Jr	27	·77	1	F	26	·30	2	Mr	27	·83
5	S	21	·01	6	O	20	·54	1	N	19○	·07		2	D	18	·60	98	4	Jr	17	·13	5	F	15	·66	7	Mr	17	·20
3	O	9	·91	5	N	8●○	44	6	D	7	·97	99	1	Jr	6	·50		5	F	5	·03	4	Mr	6	·56	6	Ap	5	·09
1	S	29	·28	2	O	28	·81	4	N	27	·34	18	5	D	26	·87	00	7	Jr	25	·40	1	F	23	·93	3	Mr	25○	·46
5	S	18○	·64	7	O	18	·17	1	N	16	·70		3	D	16	24	01	4	Jr	14	·77	6	F	13	30	7	Mr	14○	·83
4	O	7	·54	6	N	6	·07	7	D	5	·60	02	2	Jr	4	18		3	F	2	·66	5	Mr	4○	·19	6	Ap	2	·72
1	S	26	·91	3	O	26	·44	4	N	24	·97		6	D	24	·50	03	1	Jr	28	·03	2	F	21	·56	4	Mr	23	·09
6	S	16	·28	7	O	15	·81	2	N	14	·34		3	D	13	·87	04	5	Jr	12○	·40	6	F	10●	·93	{1 2	Mr Ap	11 9	·46 ·99
5	O	4	·17	6	N	2	·70	1	D	2	·23		2	D	31○	·76	05	4	Jr	30	·80	5	F	28	·83	7	Mr	30	·36

* In this year **A.D. 1752**, the **New Style** was introduced by an Act of the British Parliament and 11 days were dropped out, that is, the next day after Wednesday, **2** September **1752** was declared to be Thursday, **14** September **1752**. Hence the new moon after **28** August **1752** which ordinarily would have occurred on **26** September **1752** actually occurred on **8** October **1752**.

TABLE II —

Kaliyuga.	Vikrama era	Śaka era.	Commencement of solar year. Month and day A.D.	Commencement of solar year. Fraction of day.	First new-moon in solar year.	Anomaly of first new-moon	Christian era	Vaiśākha. Week-day.	Month.	Day.	Fraction	Jyeshṭha. Week-day.	Month.	Day.	Fraction	Āshāḍha. Week-day.	Month.	Day	Fraction.	Śrāvaṇa. Week-day.	Month	Day.	Fraction	Bhādrapada. Week-day.	Month	Day.	Fraction.
							A.D.																				
4906	1862	1727	11A	·0385	17·8401	23·856	**1805**	1	Ap	28	·89	3	My	28	·42	4	Je	26●○	·95	6	Jl	26	·48	1	Au	25	·01
4907	1863	1728	11A	·2973	6·9574	20·018	**1806**	6	Ap	18	·25	7	My	17	·78	2	Je	16	·32	3 5	Jl Au	15 14	·85 ·88	6	S	12	·91
4908	1864	1729	11A	·5561	25 5963	18·147	**1807**	5	My	7○	·15	6	Je	5●	·68	1	Jl	5	21	2	Au	3	·74	4	S	2	·27
4909	1865	1730	10A	·8148	14·7046	14·304	**1808**	2	Ap	25○	·52	4	My	25	·05	5	Je	28	·58	7	Jl	23	·11	1	Au	21	·64
4910	1866	1731	11A	·0736	3·8129	10 461	**1809**	6	Ap	14○	·89	1	My	14	·42	2 4	Je Jl	12 12	·95 ·48	6	Au	11	·01	7	S	9	·54
4911	1867	1732	11A	·3323	22 4518	8·594	**1810**	5	My	8	·78	7	Je	2	·31	1	Jl	1	·84	3	Jl	31	·37	4	Au	29	·91
4912	1868	1733	11A	·5911	11·5601	4 752	**1811**	3	Ap	23	·15	4	My	22	·68	6	Je	21	·21	7	Jl	20	·74	2	Au	19○	·27
4913	1869	1734	10A	8498	0·6684	0 909	**1812**	7 2	Ap My	11 11	·52 05	3	Je	9	·58	5	Jl	9	·11	6	Au	7○	·64	1	S	6	·17
4914	1870	1735	11A	·1086	19·3073	26·597	**1813**	6	Ap	30	·12	7	My	29	·95	2	Je	28	48	4	Jl	28○	·00	5	Au	26	·54
4915	1871	1736	11A	·3674	8 4156	22 754	**1814**	3	Ap	19	·78	5	My	19	·31	6	Je	17	·84	1	Jl	17●	37	2 4	Au S	15 14	·90 ·44
4916	1872	1737	11A	·6261	27 0545	20 887	**1815**	2	My	8	68	4	Je	7○	21	5	Jl	6●	·74	7	Au	5	·27	1	S	3	·80
4917	1873	1738	10A	·8849	16 1628	17·044	**1816**	7	Ap	27	05	1	My	26○	·58	3	Je	25	11	4	Jl	24	·64	6	Au	23	·17
4918	1874	1739	11A	·1436	5·2711	13·202	**1817**	4	Ap	16	·41	5	My	15●	94	7	Je	14	48	2 3	Jl Au	14 12	·01 ·54	5	S	11	·07
4919	1875	1740	11A	·4024	23·9099	11·335	**1818**	3	My	5●	·81	4	Je	3	·84	6	Jl	3	·37	7	Au	1	·90	2	Au	31	48
4920	1876	1741	11A	·6611	13·0182	7·492	**1819**	7	Ap	24	·68	2	My	24	·21	3	Je	22	74	5	Jl	22	·27	6	Au	20	80
4921	1877	1742	10A	·9199	2 1265	8·649	**1820**	5	Ap	13	·05	6 1	My Je	12 11	·58 ·11	2	Jl	10	·64	4	Au	9	·17	5	S	7○	70
4922	1878	1743	11A	·1787	20·7654	1 783	**1821**	3	My	1	·94	5	My	31	·47	7	Je	30	·00	1	Jl	29	·54	3	Au	28	07
4923	1879	1744	11A	·4374	9·8737	25·495	**1822**	1	Ap	21	·31	2	My	20	84	4	Je	19	·37	5	Jl	18○	·90	7	Au	17	43
4924	1880	1745	11A	·6962	28 5126	23 628	**1823**	7	My	10	·21	1	Je	8	·74	3	Jl	8○	·27	4	Au	6	·80	6	S	5	33
4925	1881	1746	10A	·9549	17·6209	19·785	**1824**	4	Ap	28	·58	6	My	28	·11	7	Je	26●○	·64	2	Jl	26	·17	3	Au	24	70
4926	1882	1747	11A	·2137	6 7292	15 942	**1825**	1	Ap	17	94	3	My	17○	·47	5	Je	16●	·00	6 1	Jl Au	15 14	·58 ·06	2	S	12	60
4927	1883	1748	11A	·4724	25 3681	14 076	**1826**	7	My	6○	·84	2	Je	5	37	3	Jl	4	·90	5	Au	3	·43	6	S	1	·96
4928	1884	1749	11A	·7312	14 4764	10 233	**1827**	5	Ap	26●○	·21	6	My	25	·74	1	Je	24	·27	2	Jl	23	80	4	Au	22	·83
4929	1885	1750	10A	·9899	3·5847	6 390	**1828**	2	Ap	14●	·57	4	My	14	·10	5 7	Je Jl	12 12	·64 ·17	1	Au	10	·70	3	S	9	·23
4930	1886	1751	11A	·2487	22·2236	4 523	**1829**	1	My	3	·47	3	Je	2	·00	4	Jl	1	·53	6	Jl	31	·08	7	Au	29○	59
4931	1887	1752	11A	·5075	11·3319	0 681	**1830**	5	Ap	22	·84	7	My	22	·37	1	Je	20	·90	3	Jl	20	·43	4	Au	18○	·96
4932	1888	1753	11A	·7662	0·4402	24 392	**1831**	3 4	Ap My	12 11	·21 ·74	6	Je	10	·27	7	Jl	9	·80	2	Au	8○	·33	3	S	6	·86
4933	1889	1754	11A	·0250	19·0791	22·526	**1832**	2	Ap	30	·10	3	My	29	·63	5	Je	28	16	6	Jl	27●	·70	1	Au	26	28
4934	1890	1755	11A	·2837	8.1874	18·683	**1833**	6	Ap	19	·47	1	My	19	·00	2	Je	17○	·53	4	Jl	17●	·06	5 7	Au S	15 14	·59 ·12
4935	1891	1756	11A	·5425	26·8268	16 816	**1834**	5	My	8	·37	6	Je	6○	·90	1	Jl	6	·43	2	Au	4	·96	4	S	3	·49
4936	1892	1757	11A	·8012	15 9346	12 973	**1835**	2	Ap	27	·74	4	My	27○	·27	5	Je	25	·80	7	Jl	25	·33	1	Au	28	·86
4937	1893	1758	11A	·0600	5·0429	9·131	**1836**	7	Ap	16○	·10	1	My	15	·63	3 4	Je Jl	14 13	·16 ·69	6	Au	12	·22	7	S	10	·76
4938	1894	1759	11A	·3188	23·6819	7·264	**1837**	6	My	5	·00	7	Je	3	·53	2	Jl	3	·06	3	Au	1	·59	5	Au	31	·12
4939	1895	1760	11A	·5775	12·7900	3 421	**1838**	3	Ap	24	·37	4	My	23	·90	6	Je	22	·43	7	Jl	21	·96	2	Au	20	·49
4940	1896	1761	11A	·8363	1·8983	27·133	**1839**	7	Ap	13	·78	2 3	My Je	13 11	·26 ·80	5	Jl	11	·83	6	Au	9	·86	1	S	8	·39
4941	1397	1762	11A	·0950	20·5372	25·266	**1840**	6	My	1	·63	1	My	31	·16	2	Je	29	·69	4	Jl	29○	·22	5	Au	27●	·75
4942	1898	1763	11A	·3538	9 6455	21 424	**1841**	4	Ap	21	·00	5	My	20	53	7	Je	19	·06	1	Jl	18○	·59	3	Au	17	·12
4943	1899	1764	11A	·6125	28·2844	19·557	**1842**	2	My	9	·90	4	Je	8	·43	5	Jl	7●○	·96	7	Au	6	·49	2	S	5	·02
4944	1900	1765	11A	·8713	17·3927	15·714	**1843**	7	Ap	29	26	1	My	28	·79	3	Je	27	·32	4	Jl	26	·86	6	Au	25	·39
4945	1901	1766	11A	·1300	6·5010	11 871	**1844**	4	Ap	17	·63	6	My	17○	·16	7	Je	15	·69	2 3	Jl Au	15 13	·22 ·75	5	S	12	28
4946	1902	1767	11A	·3888	25·1899	10·004	**1845**	3	My	6●○	·58	5	Je	5	·06	6	Jl	4	·59	1	Au	3	·12	2	S	1	·65
4947	1903	1768	11A	·6476	14·2182	6·162	**1846**	7	Ap	25	·90	2	My	25	·43	3	Je	23	·96	5	Jl	23	·49	7	Au	22	·02
4948	1904	1769	11A	·9063	8·3535	2 319	**1847**	5	Ap	15●	·26	6 1	My Je	14 13	·79 ·32	2	Jl	12	·85	4	Au	11	·38	5	S	9○	·92
4949	1905	1770	11A	·1651	21·9954	0 452	**1848**	4	My	3	·16	5	Je	1	·69	7	Jl	1	·22	1	Jl	30	·75	3	Au	29○	·28
4950	1906	1771	11A	·4238	11·1037	24·164	**1849**	1	Ap	22	·53	3	My	22	·06	4	Je	20	·59	6	Jl	20	·12	7	Au	18●○	·65
4951	1907	1772	11A	·6826	0·2120	20·321	**1850**	5 7	Ap My	11 11	·89 ·42	1	Je	9	·96	3	Jl	9	·49	5	Au	8	·02	6	S	6	·55
4952	1908	1773	11A	·9413	18·8509	18 454	**1851**	4	Ap	30	·79	6	My	30	·32	7	Je	28○	·85	2	Jl	28	·38	3	Au	26	·91
4953	1909	1774	11A	·2001	7·9592	14·612	**1852**	2	Ap	19	·16	3	My	18	·69	5	Je	17○	·22	6	Jl	16	·75	1 2	Au S	15 13	·28 ·81
4954	1910	1775	11A	·4589	26·5981	12·745	**1853**	1	My	8	·06	2	Je	6○	·59	4	Jl	6	·12	5	Au	4	·65	7	S	3	·18
4955	1911	1776	11A	·7176	15·7064	8·902	**1854**	5	Ap	27○	·42	6	My	26	·95	1	Je	25	·48	3	Jl	25	·01	4	Au	23	·55
4956	1912	1777	11A	9764	4·8147	5·060	**1855**	2	Ap	16○	·79	4	My	16●	·32	5 7	Je Jl	14 14	·85 ·38	1	Au	12	·91	3	S	11	·44
4957	1913	1778	11A	·2351	23·4535	3·193	**1856**	1	My	4	·69	3	Je	3	·22	4	Jl	2	·75	6	Au	1	·28	7	Au	30	·81
4958	1914	1779	11A	·4939	12·5618	26·905	**1857**	6	Ap	24	·06	7	My	23	·59	2	Je	22	·12	3	Jl	21	·65	5	Au	20	·18
4959	1915	1780	11A	·7526	1·6701	23·062	**1858**	3	Ap	13	·42	4 6	My Je	12 11	·95 ·48	1	Jl	11	·01	2	Au	9○	·54	4	S	8	·08

N.B.—**For tithis by other siddhāntas add to the above algebraically as follows :—**

Sūrya siddhānta—*cont.*

Āśvina. Week-day	Month	Day	Fraction.	Kārttika. Week-day	Month.	Day	Fraction.	Mārgaśirsha. Week-day.	Month	Day	Fraction	A.D.	Pausha. Week-day	Month	Day	Fraction	A.D.	Māgha. Week-day	Month	Day	Fraction	Phālguna. Week day	Month	Day	Fraction	Chaitra. Week day	Month.	Day.	Fraction.
2	S	28	·54	4	O	28	·07	5	N	21	60		7	D	21○	·13	**06**	1	Jr	19	·66	8	F	18	·19	4	Mr	19	72
1	O	12	·44	2	N	10	·97	4	D	10●	·50	**07**	6	Jr	9	·03		7	F	7	·56	2	Mr	9	·09	3	Ap	7	·62
5	O	1	·80	7	O	31○	34	1	N	29●	·87		3	D	29	·40	**08**	4	Jr	27	·93	6	F	26	·46	7	Mr	26	·99
3	S	20	·17	4	O	19○	70	6	N	18●	·23		7	D	17	76	**09**	2	Jr	16	29	3	F	14	·82	5	Mr	16	·36
2	O	9○	·07	3	N	7	·60	5	D	7	18	**10**	6	Jr	5	·66		1	F	4	·19	2	Mr	5	·72	4	Ap	4●	25
6	S	28	·44	7	O	27	·97	2	N	26	50		4	D	26	·03	**11**	5	Jr	24	·56	7	F	23○	·09	1	Mr	24	·62
3	S	17	·80	5	O	17	·33	6	N	15	·86		1	D	15	40	**12**	2	Jr	13	·93	4	F	12○	·46	5	Mr	12	99
2	O	5	70	4	N	4	28	5	D	3	76	**13**	7	Jr	2	29		1	Jr	31●○	·82	3	Mr	2	·35	4	Mr	31	·88
7	S	25	07	1	O	24	·60	3	N	23	18		4	D	22	·66	**14**	6	Jr	21	·19	7	F	19	·72	2	Mr	21	25
5	O	13	97	7	N	12	50	2	D	12○	·03	**15**	3	Jr	10	·56		5	F	9	09	6	Mr	10	62	1	Ap	9	15
8	O	3	33	4	N	1	·86	6	D	1○	39		7	D	30	·92	**16**	2	Jr	29	·46	3	F	27	·99	5	Mr	28	·52
7	S	21	·70	2	O	21	23	3	N	19●○	·76		5	D	19	·29	**17**	6	Jr	17	·82	1	F	16	·35	2	Mr	17	88
6	O	10	60	1	N	9●	·13	2	D	8	66	**18**	4	Jr	7	·19		5	F	5	·72	7	Mr	7	·25	1	Ap	5○	·78
8	S	29○	96	5	O	29	·50	7	N	28	03		1	D	27	56	**19**	3	Jr	26	·09	4	F	24	·62	6	Mr	26○	·15
1	S	19●○	·33	2	O	18	86	4	N	17	·89		5	D	16	·92	**20**	7	Jr	15	·45	1	F	13	·98	8	Mr	14○	·52
7	O	7	·23	1	N	5	76	3	D	5	·29	**21**	4	Jr	3	82		6	F	2	·35	7	Mr	3●	88	2	Ap	2	41
4	S	26	60	6	O	26	13	7	N	24	·66		2	D	24	·19	**22**	3	Jr	22○	72	5	F	21	·25	6	Mr	22	78
{1	S	15	96	5	N	14	02	6	D	18	·56		**Pausha Kshaya.**				**23**	1	Jr	12○	·09	2	F	10●	·62	{4	Mr	12	·15
{3	O	15	·19																							{5	Ap	10	68
7	O	4	86	2	N	3	39	8	D	2	·92	**24**	5	Jr	1○	·45		6	Jr	30	·98	1	F	29	·51	3	Mr	30	04
5	S	28	23	6	O	22	76	1	N	21	·29		2	D	20●	·82	**25**	4	Jr	19	·35	5	F	17	·88	7	Mr	19	41
4	O	12	13	5	N	10○	·66	7	D	10	·19	**26**	1	Jr	8	72		3	F	7	·25	4	Mr	8	·78	6	Ap	7	·31
1	O	1	49	3	O	31○	02	4	N	29	55		6	D	29	·08	**27**	7	Jr	27	·62	2	F	26	·15	3	Mr	27	68
5	S	20	·86	7	O	20○	39	1	N	18	·92		3	D	18	45	**28**	4	Jr	16	·98	6	F	15	·51	1	Mr	16	·04
4	O	8●	·76	6	N	7	29	7	D	6	82	**29**	2	Jr	5	·35		8	F	3	88	5	Mr	5○	·41	6	Ap	8	·94
2	S	28●	·12	8	O	27	66	5	N	26	19		6	D	25	·72	**30**	1	Jr	24	25	2	F	22●○	·78	4	Mr	24	·31
6	S	17	·49	1	O	17	·02	2	N	15	·55		4	D	15	·08	**31**	5	Jr	13	61	7	F	12○	·14	1	Mr	13	68
5	O	6	89	6	N	4	92	1	D	4	45	**32**	2	Jr	2	98		4	F	1	51	6	Mr	2	04	7	Mr	31	57
2	S	24	76	4	O	24	29	5	N	22	·82		7	D	22○	35	**33**	1	Jr	20	·88	8	F	19	41	4	Mr	20	94
1	O	13	65	3	N	12	18	4	D	11○	·72	**34**	6	Jr	10	·25		7	F	8	·78	2	Mr	10	31	3	Ap	8	·84
6	O	3	02	7	N	1	55	2	D	1○	08		3	D	30	·61	**35**	5	Jr	29	14	6	F	27	·67	1	Mr	29	·20
8	S	22	·39	4	O	21	92	6	N	20●	45		7	D	19	98	**36**	2	Jr	18	·51	4	F	17	04	5	Mr	17	·57
2	O	10○	29	3	N	8●	82	5	D	8	35	**37**	6	Jr	6	88		1	F	5	41	2	Mr	6	94	4	Ap	5○	·47
6	S	29○	65	1	O	29	18	2	N	27	·71		4	D	27	24	**38**	5	Jr	25	78	7	F	24	31	1	Mr	25○	84
4	S	19○	·02	5	O	18	55	7	N	17	08		1	D	16	·61	**39**	3	Jr	15	·14	4	F	13	67	6	Mr	15	20
2	O	7	·92	4	N	6	·45	5	D	5	·98	**40**	7	Jr	4	51		2	F	8○	04	8	Mr	3●	57	5	Ap	2	·10
7	S	26	·28	1	O	25	·82	3	N	24	35		4	D	23	88	**41**	6	Jr	22○	41	7	F	20	·94	2	Mr	22	·47
{4	S	15	65	7	N	13	71	2	D	13	·24	**42**	3	Jr	11○	·77		5	F	10	·30	6	Mr	11	84	1	Ap	10	37
{6	O	15	18																										
3	O	4	55	5	N	3	·08	6	D	2	·61	**43**	1	Jr	1	·14		2	Jr	30	·67	4	Mr	1	·20	5	Mr	30	·78
7	S	28	92	2	O	23	·45	3	N	21○	·98		5	D	21●	·51	**44**	7	Jr	20	04	1	F	18	57	3	Mr	19	·10
6	O	11	81	1	N	10○	·84	2	D	9	·88	**45**	4	Jr	8	·41		5	F	6	·94	7	Mr	8	17	2	Ap	7	·00
4	O	1	·18	5	O	30○	·71	7	N	29	·24		1	D	28	·77	**46**	3	Jr	27	·30	4	F	25	·83	6	Mr	27	36
1	S	20	55	3	O	20●	·08	4	N	18	·61		6	D	18	14	**47**	7	Jr	16	·67	2	F	15	20	3	Mr	16○	·73
7	O	9●	·45	1	N	7	98	3	D	7	·51	**48**	5	Jr	6	04		6	F	4	·57	1	Mr	5○	10	2	Ap	8	63
4	S	27●	81	6	O	27	84	7	N	25	87		2	D	25	40	**49**	3	Jr	23	94	5	F	22●○	·47	7	Mr	24	00
2	S	17	·18	3	O	16	71	5	N	15	·24		6	D	14	·77	**50**	1	Jr	13	·30	2	F	11●	·83	4	Mr	18	·86
1	O	6	·08	2	N	4	·61	4	D	4	14	**51**	5	Jr	2○	·67		7	F	1	20	1	Mr	2	73	3	Ap	1	26
5	S	25	44	6	O	24	·98	1	N	23	·51		3	D	23○	04	**52**	4	Jr	21	·57	6	F	20	·10	7	Mr	20	63
4	O	13	34	5	N	11	87	7	D	11●○	·40	**53**	1	Jr	9	98		3	F	8	·46	5	Mr	10	00	6	Ap	8	·53
1	O	2	71	8	N	1	·24	4	N	30	·77		6	D	30	80	**54**	7	Jr	28	·83	2	F	27	36	3	Mr	28	·89
6	S	22	·08	7	O	21○	·61	2	N	20	·14		3	D	19	67	**55**	5	Jr	18	·20	6	F	16	73	1	Mr	18	·26
4	O	10○	·97	6	N	9	·50	1	D	9	·04	**56**	2	Jr	7	57		4	F	6	·10	5	Mr	6	·63	7	Ap	5●○	·16
2	S	29●○	·34	3	O	28	·87	5	N	27	·40		6	D	26	·93	**57**	1	Jr	25	·46	2	F	23	99	4	Mr	25	·52
6	S	18●	·71	1	O	18	24	2	N	16	77		4	D	16	·30	**58**	5	Jr	14	83	7	F	13○	36	1	Mr	14●	80
5	O	7	·61	7	N	6	·14	1	D	5	67	**59**	3	'r	4	·20		4	F	2○	73	6	Mr	4	26	7	Ap	2	79

(1) for Ārya siddhānta +·06; (2) for Brahma siddhānta −·11; and (3) for Siddhānta Śirōmaṇi − 04.

TABLE II.—

Kaliyuga	Vikrama era	Śaka era	Commencement of solar year: Month and day A.D.	Commencement of solar year: Fraction of day	First new-moon in Solar Year	Anomaly of first new moon	Christian era	Vaiśākha				Jyeshṭha				Āshāḍha				Śrāvaṇa				Bhādrapada			
							A.D.	Week-day	Month	Day	Fraction	Week-day	Month	Day	Fraction	Week-day	Month	Day	Fraction	Week-day	Month	Day	Fraction	Week-day	Month	Day	Fraction
4960	1916	1781	12A	·0114	20·3090	21·195	**1859**	2	My	2	·32	3	My	31	·85	5	Je	30	·38	6	Jl	29○	·91	1	Au	28	·44
4961	1917	1782	11A	·2702	9·4173	17·352	**1860**	6	Ap	20	·69	1	My	20	·22	2	Je	18	·75	4	Jl	18○	·28	5	Au	16	·81
4962	1918	1783	11A	5289	28·0562	15·487	**1861**	5	My	9	·58	7	Je	8	·12	1	Jl	7●	·65	3	Au	6	·18	4	S	4	·71
4963	1919	1784	11A	·7877	17·1645	11·643	**1862**	2	Ap	28	·95	4	My	28○	·48	6	Je	27	·01	7	Jl	26	·54	2	Au	25	·07
4964	1920	1785	12A	·0464	6·2728	7·800	**1863**	7	Ap	18	·32	1	My	17○	·85	3	Je	16	·88	4 6	Jl Au	15 14	·91 ·44	7	S	12	·97
4965	1921	1786	11A	·3052	24·9117	5·933	**1864**	6	My	6●	·22	7	Je	4	·75	2	Jl	4	·28	3	Au	2	·81	5	S	1	·84
4966	1922	1787	11A	·5639	14·0200	2·091	**1865**	3	Ap	25	·58	5	My	25	·11	6	Je	23	·64	1	Jl	23	·18	2	Au	21	71
4967	1923	1788	11A	·8227	3·1283	25·803	**1866**	7	Ap	14	·95	2 4	My Je	14 13	·48 ·01	5	Jl	12	·54	7	Au	11	·07	1	S	9○	·60
4968	1924	1789	12A	·0814	21·7672	23·936	**1867**	6	My	3	·85	1	Je	2	·38	2	Jl	1	·91	4	Jl	31	·44	5	Au	29○	·97
4969	1925	1790	11A	·3402	10·8755	20·093	**1868**	4	Ap	22	22	5	My	21	·75	7	Je	20	·28	1	Jl	19	·81	3	Au	18●	·34
4970	1926	1791	11A	·5990	29·5144	18·226	**1869**	1 3	Ap My	11 11	·58 11	4	Je	9	·64	6	Jl	9○	·17	7	Au	7	·70	2	S	6	·24
4971	1927	1792	11A	8577	18·6227	14·384	**1870**	7	Ap	30	·48	2	My	30	·01	3	Je	28○	·51	5	Jl	28	·07	6	Au	26	·60
4972	1928	1793	12A	·1165	7·7310	10·541	**1871**	4	Ap	19	·85	6	My	19	·38	7	Je	17●○	·91	2	Jl	17	·44	3 5	Au S	15 14	·97 ·50
4973	1929	1794	11A	·3752	26·3698	8·674	**1872**	3	My	7○	·74	5	Je	6●	·28	6	Jl	5	·81	1	Au	4	·34	2	S	2	·87
4974	1930	1795	11A	·6340	15·4781	4·831	**1873**	1	Ap	27○	·11	2	My	26	·64	4	Je	25	·17	5	Jl	24	·70	7	Au	23	·23
4975	1931	1796	11A	·8927	4·5864	0·989	**1874**	5	Ap	16○	·48	7	My	16	·01	1 3	Je Jl	14 14	·54 ·07	4	Au	12	·60	6	S	11	·13
4976	1932	1797	12A	·1515	23·2254	26·676	**1875**	4	My	5	·38	5	Je	3	·91	7	Jl	3	·44	1	Au	1	·97	3	Au	31	·50
4977	1933	1798	11A	·4103	12·3336	22·834	**1876**	1	Ap	23	·74	3	My	23	·27	4	Je	21	·80	6	Jl	21	·34	7	Au	19○	·87
4978	1934	1799	11A	·6690	1·4419	18·991	**1877**	6	Ap	13	·11	7 2	My Je	12 11	·64 ·17	3	Jl	10	70	5	Au	9○	·23	6	S	7	·76
4979	1935	1800	11A	·9278	20·0808	17·124	**1878**	5	My	2	·01	6	My	31	·54	1	Je	30	07	2	Jl	29○	·60	4	Au	28	·13
4980	1936	1801	12A	1865	9·1891	13·281	**1879**	2	Ap	21	·38	3	My	20	·91	5	Je	19	·44	6	Jl	18●	·97	1	Au	17	·50
4981	1937	1802	11A	·4453	27·8280	11·415	**1880**	1	My	9	·27	2	Je	7○	·80	4	Jl	7	·33	5	Au	5	·86	7	S	4	·40
4982	1938	1803	11A	·7040	16·9363	7·572	**1881**	5	Ap	28	·64	7	My	28●○	17	1	Je	26	·70	3	Jl	26	·23	4	Au	24	76
4983	1939	1804	11A	·9628	6·0446	3·729	**1882**	3	Ap	18	·01	4	My	17●	·54	6	Je	16	·07	7 2	Jl Au	15 14	·60 ·13	3	S	12	·66
4984	1940	1805	12A	·2216	24·6835	1·862	**1883**	1	My	6	·90	3	Je	5	·44	4	Jl	4	·97	6	Au	3	·50	1	S	2	·03
4985	1941	1806	11A	·4803	13·7918	25·574	**1884**	6	Ap	25	·27	7	My	24	·80	2	Je	23	·33	3	Jl	22	·86	5	Au	21	·39
4986	1942	1807	11A	·7391	2·9008	21·732	**1885**	3	Ap	14	·64	5 6	My Je	14 12	·17 ·70	1	Jl	12	·23	2	Au	10	·76	4	S	9○	·29
4987	1943	1808	11A	·9978	21·5890	19·865	**1886**	2	My	3	·54	4	Je	2	·07	5	Jl	1	·60	7	Jl	31	·13	1	Au	29	·66
4988	1944	1809	12A	·2566	10·6473	16·022	**1887**	6	Ap	22	·90	1	My	22	·43	2	Je	20	·96	4	Jl	20○	·50	6	Au	19●	·03
4989	1945	1810	11A	·5153	29·2862	14·155	**1888**	5	My	10	·80	7	Je	9	·33	1	Jl	8○	·86	3	Au	7	·39	4	S	5	·92
4990	1946	1811	11A	·7741	18·3945	10·313	**1889**	3	Ap	30	·17	4	My	29	·70	6	Je	28●○	23	7	Jl	27	·76	2	Au	26	·29
4991	1947	1812	12A	·0328	7·5028	6·470	**1890**	7	Ap	19	·54	2	My	19○	·07	3	Je	17●	·60	5	Jl	17	13	6 1	Au S	15 14	·66 ·19
4992	1948	1813	12A	·2916	26·1416	4·603	**1891**	6	My	8○	·43	7	Je	6	·96	2	Jl	6	·49	4	Au	5	·02	5	S	3	·55
4993	1949	1814	11A	·5504	15·2499	0·760	**1892**	3	Ap	26○	·80	5	My	26	·33	6	Je	24	86	1	Jl	24	·39	2	Au	22	·92
4994	1950	1815	11A	·8091	4·3582	24·472	**1893**	1	Ap	16	·17	2	My	15	·70	4 5	Je Jl	14 13	·23 ·76	7	Au	12	·29	1	S	10	·82
4995	1951	1816	12A	0673	22·9971	22·605	**1894**	7	My	5	·06	1	Je	3	·59	3	Jl	3	13	4	Au	1	·66	6	Au	31○	·19
4996	1952	1817	12A	·3266	12·1054	18·763	**1895**	4	Ap	24	·48	5	My	23	96	7	Je	22	·49	2	Jl	22	·02	3	Au	20●○	·55
4997	1953	1818	11A	·5854	1·2137	14·920	**1896**	1	Ap	12	·80	3 4	My Je	12 10	·33 ·86	6	Jl	10	·39	7	Au	8●○	92	2	S	7	·45
4998	1954	1819	11A	·8441	19·8526	13·053	**1897**	7	My	1	·70	2	My	31	·23	3	Je	29	·76	5	Jl	29	·29	6	Au	27	·82
4999	1955	1820	12A	·1029	8·9609	9·210	**1898**	5	Ap	21	·06	6	My	20	·59	1	Je	19○	·12	2	Jl	18	·65	4	Au	17	·19
5000	1956	1821	12A	3617	27·5998	7·314	**1899**	3	My	9	·96	5	Je	8○	·49	7	Jl	8	·02	1	Au	6	·55	3	S	5	·08
5001	1957	1822	12A	·6204	16·7081	3·504	**1900**	1	Ap	29	33	2	My	28●○	·86	4	Je	27	·39	5	Jl	26	·92	7	Au	25	·45
5002	1958	1823	12A	·8792	5·8164	27·215	**1901**	5	Ap	18	·69	7	My	18●	·23	1	Je	16	·76	3 4	Jl Au	16 14	·29 ·82	6	S	13	·35
5003	1959	1824	13A	·1379	24·4553	25·349	**1902**	4	My	7	·59	6	Je	6	·12	7	Jl	5	·65	2	Au	4	·18	3	S	2	·71
5004	1960	1825	13A	·3967	13·5636	21·506	**1903**	1	Ap	26	·96	3	My	26	·49	5	Je	25	·02	6	Jl	24	·55	1	Au	23	·08
5005	1961	1826	12A	·6554	2·6719	17·663	**1904**	6	Ap	15	·33	7 2	My Je	14 13	·86 ·39	3	Jl	12	92	5	Au	11	·45	6	S	9	·98
5006	1962	1827	12A	·9142	21·3107	15·796	**1905**	5	My	4	·22	6	Je	2	·75	1	Jl	2	29	2	Jl	31○	·82	4	Au	30●	·35
5007	1963	1828	13A	·1729	10·4190	11·954	**1906**	2	Ap	23	·59	4	My	23	·12	5	Je	21	·65	7	Jl	21○	·18	1	Au	19●	·71
5008	1964	1829	13A	·4317	29·0579	10·087	**1907**	1	My	12	·49	3	Je	11	·02	4	Jl	10○	·55	6	Au	9	·08	7	S	7	·61
5009	1965	1830	12A	·6905	18·1662	6·214	**1908**	5	Ap	30	·86	7	My	30	·39	1	Je	28●	·92	3	Jl	28	·45	4	Au	26	·98
5010	1966	1831	12A	·9492	7·2745	2·401	**1909**	3	Ap	20	·22	4	My	19○	·75	6	Je	18●	·28	7 2	Jl Au	17 16	·81 ·35	3	S	14	·88
5011	1967	1832	13A	·2080	25·9184	0·535	**1910**	2	My	9○	·12	3	Je	7	·65	5	Jl	7	·18	6	Au	5	·71	1	S	4	·24
5012	1968	1833	13A	4667	15·0217	24·246	**1911**	6	Ap	28	·49	1	My	28	·02	2	Je	26	·55	4	Jl	26	·08	5	Au	24	·61
5013	1969	1834	12A	7255	4·1300	20·404	**1912**	3	Ap	16●	·85	5	My	16	·39	6 1	Je Jl	14 14	·92 ·45	2	Au	12	·98	4	S	11○	·51
5014	1970	1835	12A	·9842	22·7689	18·537	**1913**	2	My	5	·75	4	Je	4	·28	5	Jl	3	·81	7	Au	2	·34	1	Au	31○	·87

Sūrya siddhānta—*cont.*

Āśvina. Week-day.	Month.	Day.	Fraction.	Kārttika. Week-day.	Month.	Day.	Fraction.	Mārgaśīrsha. Week-day.	Month.	Day.	Fraction.	A.D.	Pausha. Week-day.	Month.	Day.	Fraction.	A.D.	Māgha. Week-day.	Month.	Day.	Fraction.	Phālguna. Week-day.	Month.	Day.	Fraction.	Chāitra. Week-day.	Month.	Day.	Fraction.
2	S	26	·97	4	O	26	·50	6	N	25	03		7	D	24	56	**60**	2	Jr	23○	10	3	F	21	·63	5	Mr	22	16
{7	S	15	·34	3	N	13	·40	4	D	12	93	**61**	6	Jr	11●	46		7	F	9	99	2	Mr	11	52	4	Ap	10	05
{1	O	14	·87																										
6	O	4	·24	7	N	2	·77	2	D	2○	80		3	D	31	83	**62**	5	Jr	30	·36	6	F	28	·89	1	Mr	30	·42
3	S	23	·60	5	O	23	14	6	N	21○	67		1	D	21●	·20	**63**	2	Jr	19	73	4	F	18	·26	5	Mr	19	·79
2	O	12	·50	4	N	11○	·03	5	D	10	·56	**64**	7	Jr	9	·09		1	F	7	·62	3	Mr	8	16	4	Ap	6	69
6	S	30	·87	1	O	30	·40	2	N	28	93		4	D	28	46	**65**	5	Jr	26	·99	7	F	25	·52	2	Mr	27○	05
4	S	20○	·24	5	O	19	·77	7	N	18	30		1	D	17	·83	**66**	3	Jr	16	36	4	F	14	·89	6	Mr	16○	·42
3	O	9	·13	4	N	7	·66	6	D	7	·20	**67**	7	Jr	5	73		2	F	4	·26	3	Mr	5●○	79	5	Ap	4	·32
7	S	28	·50	2	O	28	03	3	N	26	·56		5	D	26	·09	**68**	6	Jr	24	62	1	F	23	15	2	Mr	23	·69
4	S	16	·87	6	O	16	40	7	N	14	·93		2	D	14	·46	**69**	3	Jr	12○	99	5	F	11	·52	7	Mr	13	05
3	O	5	·77	5	N	4	·30	6	D	3	83	**70**	1	Jr	2○	36		2	Jr	31	·89	4	Mr	2	42	5	Mr	31	·95
1	S	25	·13	2	O	24	·66	4	N	23	19		5	D	22○	·72	**71**	7	Jr	21	26	1	F	19	·79	3	Mr	21	·32
7	O	14	·03	1	N	12	56	3	D	12●	09	**72**	4	Jr	10	·62		6	F	9	·15	7	Mr	9	·68	2	Ap	8	21
4	O	2	·40	5	O	31○	·93	7	N	30	46		1	D	29	89	**73**	3	Jr	28	52	5	F	27	·05	6	Mr	28	·58
1	S	21	·76	3	O	21○	·30	4	N	19	·83		6	D	19	36	**74**	7	Jr	17	·89	2	F	16	·42	3	Mr	17	·95
7	O	10●○	·66	2	N	9	·19	3	D	8	·72	**75**	5	Jr	7	·25		6	F	5	·78	1	Mr	7	·31	2	Ap	5●	·85
5	S	30●	·08	6	O	29	·56	1	N	28	·09		2	D	27	62	**76**	4	Jr	26	15	5	F	24○	68	7	Mr	25	·21
2	S	18	·40	3	O	17	·93	5	N	16	46		6	D	15	99	**77**	1	Jr	14	52	3	F	13○	·05	4	Mr	14●	·58
1	O	7	·29	2	N	5	·82	4	D	5	·36	**78**	5	Jr	3	·89		7	F	2○	42	1	Mr	3	95	3	Ap	2	·48
5	S	26	·66	7	O	26	·19	1	N	24	72		3	D	24	·25	**79**	4	Jr	22●	78	6	F	21	31	7	Mr	22	·84
{3	S	16	·03	6	N	14	·09	7	D	13○	62	**80**	2	Jr	12	15		3	F	10	·68	5	Mr	11	21	6	Ap	9	·74
{4	O	15	·56																										
1	O	3	·93	3	N	2	·46	4	D	1○	99		6	D	31	·52	**81**	1	Jr	30	05	2	F	28	58	4	Mr	30	·11
6	S	23	·29	7	O	22	82	2	N	21○	35		3	D	20	88	**82**	5	Jr	19	42	6	F	17	·95	1	Mr	19	·48
5	O	12	·19	6	N	10	72	1	D	10	25	**83**	2	Jr	8	·78		4	F	7	31	5	Mr	8	·84	7	Ap	7○	·37
2	O	1○	·56	4	O	31	09	5	N	29	·62		7	D	29	·15	**84**	1	Jr	27	·68	3	F	26	21	4	Mr	26○	·74
6	S	19○	·92	1	O	19	·46	2	N	17	·99		4	D	17	·52	**85**	6	Jr	16	·05	7	F	14	·58	2	Mr	16○	·11
5	O	8	·82	7	N	7	·35	1	D	6	·88	**86**	3	Jr	5	·41		4	F	3	94	6	Mr	5	·48	1	Ap	4	·01
3	S	28	·19	4	O	27	72	6	N	26	·25		7	D	25	78	**87**	2	Jr	24○	31	3	F	22	·84	5	Mr	24	·37
7	S	17	·56	2	O	17	09	3	N	15	62		5	D	15	15	**88**	6	Jr	13○	68	1	F	12	·21	{2	Mr	12	·74
																										{4	Ap	11	·27
6	O	5	45	7	N	3	98	2	D	3	52	**89**	4	Jr	2○	·05		5	Jr	31	58	7	Mr	2	11	1	Mr	31	64
3	S	24	82	5	O	24	·35	6	N	22	88		1	D	22	41	**90**	2	Jr	20	94	4	F	19	47	6	Mr	21	·00
2	O	18	·72	4	N	12○	25	5	D	11●	78	**91**	7	Jr	10	·31		1	F	8	·84	3	Mr	10	·37	4	Ap	8	·90
7	O	3	·09	1	N	1○	·62	3	D	1	15		4	D	30	·68	**92**	6	Jr	29	·21	7	F	27	·74	2	Mr	28	·27
4	S	21	·45	5	O	20○	·98	7	N	19	·51		2	D	19	·04	**93**	3	Jr	17	57	5	F	16	11	6	Mr	17	·64
8	O	10	·35	4	N	8	88	6	D	8	·41	**94**	7	Jr	6	·94		2	F	5	47	4	Mr	7○	00	5	Ap	5●	·58
7	S	29●	·72	2	O	29	·25	3	N	27	78		5	D	27	31	**95**	6	Jr	25	·84	1	F	24○	87	2	Mr	25	·90
5	S	19	·08	6	O	18	·61	1	N	17	15		2	D	16	68	**96**	4	Jr	15	21	5	F	13○	·74	7	Mr	14	·27
3	O	6	98	5	N	5	·51	7	D	5	·04	**97**	1	Jr	3	57		8	F	2	·10	4	Mr	8	·63	6	Ap	2	17
1	S	26	·35	2	O	25	·88	4	N	24	·41		5	D	23○	·94	**98**	7	Jr	22●	47	2	F	21	·00	3	Mr	22	·53
{5	S	15	·72	1	N	13	·78	3	D	13○	·31	**99**	4	Jr	11	·84		6	F	10	·37	7	Mr	11	·90	2	Ap	10	·48
{7	O	15	·25																										
4	O	4	·61	6	N	3	·14	7	D	2○	·67	**19**	2	Jr	1	21	**00**	3	Jr	30	74	5	Mr	1	·27	6	Mr	30	·80
1	S	23	·98	3	O	23	·51	5	N	22●	·04		6	D	21	57	**01**	1	Jr	20	10	2	F	18	·68	4	Mr	20	·16
7	O	12○	·88	2	N	11●	·41	3	D	10	·94	**02**	5	Jr	9	47		7	F	8	00	1	Mr	9	·53	3	Ap	8○	·06
5	O	2○	·25	6	O	31●	·78	1	N	30	81		2	D	29	84	**03**	4	Jr	28	37	5	F	26	·90	7	Mr	28●○	·48
2	S	21●○	·61	4	O	21	·14	5	N	19	·67		7	D	19	20	**04**	1	Jr	17	78	3	F	16	·27	4	Mr	16●	·80
1	O	9	·51	3	N	8	·04	4	D	7	57	**05**	6	Jr	6	10		7	F	4○	68	2	Mr	6	·16	3	Ap	4	·69
5	S	28	88	7	O	28	·41	1	N	26	94		3	D	26	47	**06**	5	Jr	25○	·00	6	F	23	·53	1	Mr	25	·06
3	S	18	·24	4	O	17	·77	6	N	16	·81		7	D	15	84	**07**	2	Jr	14●○	·37	3	F	12	90	{5	Mr	14	·43
																										{6	Ap	12	·96
2	O	7	·14	3	N	5	·67	5	D	5	20	**08**	6	Jr	3	78		1	F	2	·26	2	Mr	2	·79	4	Ap	1	·38
6	S	25	·51	1	O	25	·04	2	N	23	·57		4	D	23●	·10	**09**	5	Jr	21	63	7	F	20	·16	1	Mr	21	·69
5	O	14	·41	6	N	12○	·94	1	D	12	·47	**10**	3	Jr	11	00		4	F	9	53	6	Mr	11	·06	7	Ap	9	·59
2	O	3	·77	4	N	2●○	·30	5	D	1	83	.	7	D	31	·87	**11**	1	Jr	29	90	3	F	28	·43	4	Mr	29	·96
7	S	23	·14	1	O	22●	·67	3	N	21	·20		4	D	20	73	**12**	6	Jr	19	28	7	F	17	·79	2	Mr	18○	·32
6	O	11●	·04	7	N	9	·57	2	D	9	10	**13**	3	Jr	7	·68		5	F	6	·16	6	Mr	7○	·69	1	Ap	6	·22
3	S	30	·41	4	O	29	·94	6	N	28	47		1	D	28	·00	**14**	2	Jr	26	53	4	F	25○	·06	5	Mr	26	·59

(1) for Ārya siddhānta + ·06 ; (2) for Brahma siddhānta — ·11 ; and (3) for Siddhānta Śiromaṇi — ·05.

TABLE II.—

Kaliyuga.	Vikrama era.	Śaka era.	Commencement of solar year: Month and day A.D.	Commencement of solar year: Fraction of day.	First new moon in solar year	Anomaly of first new moon.	Christian era A.D.	Vaiśākha: Week-day.	Vaiśākha: Month.	Vaiśākha: Day.	Vaiśākha: Fraction.	Jyeshṭha: Week-day.	Jyeshṭha: Month.	Jyeshṭha: Day.	Jyeshṭha: Fraction.	Ashāḍha: Week-day.	Ashāḍha: Month	Ashāḍha: Day.	Ashāḍha: Fraction.	Śrāvaṇa: Week-day.	Śrāvaṇa: Month.	Śrāvaṇa: Day.	Śrāvaṇa: Fraction.	Bhādrapada: Week-day.	Bhādrapada: Month.	Bhādrapada: Day.	Bhādrapada: Fraction
5015	1971	1836	13A	2430	11 8772	14·694	**1914**	7	Ap	25	.12	1	My	24	·65	3	Je	23	·18	4	Jl	22	·71	6	Au	21●○	·24
5016	1972	1837	13A	·5018	0·9855	10·851	**1915**	4 6	Ap My	14 11	·49 02	7	Je	12	·55	2	Jl	12	·08	3	Au	10●	·61	5	S	9	·14
5017	1973	1838	12A	·7605	10 6244	8 985	**1916**	3	My	2	·38	4	My	31	91	6	Je	30○	·45	7	Jl	29	·98	2	Au	28	51
5018	1974	1839	13A	·0198	8 7827	5 142	**1917**	7	Ap	21	·75	2	My	21	·28	3	Je	19●○	81	5	Jl	19	·34	6 1	Au S	17 16	87 ·40
5019	1975	1840	13A	2780	27 3715	3 275	**1918**	6	My	10	·65	1	Je	9●○	·18	2	Jl	8	·71	4	Au	7	·24	5	S	5	·77
5020	1976	1841	13A	·5358	16 4788	26·987	**1919**	4	Ap	30	·02	5	My	29●	·55	7	Je	28	·08	1	Jl	27	·61	3	Au	26	·14
5021	1977	1842	12A	·7955	5·5881	23 144	**1920**	1	Ap	18○	·38	2	My	17	·91	4	Je	16	44	5 7	Jl Au	15 14	·97 ·51	2	S	13	·04
5022	1978	1843	13A	0543	24·2270	21·278	**1921**	7	My	7	28	1	Je	5	81	3	Jl	5	·34	4	Au	3	87	6	S	2	40
5023	1979	1844	13A	·3180	13·3353	17·435	**1922**	4	Ap	26	65	6	My	26	·18	7	Je	24	·71	2	Jl	24	24	3	Au	22	·77
5024	1980	1845	13A	·5718	2 4436	13 592	**1923**	2	Ap	16	01	3 5	My Je	15 14	·55 ·08	6	Jl	13	·61	1	Au	12○	·14	2	S	10●	·67
5025	1981	1846	12A	·8306	21·0825	11.725	**1924**	7	My	3	·91	2	Je	2	44	3	Jl	1	·97	5	Jl	31○	·50	7	Au	30●	·03
5026	1982	1847	13A	·0893	10 1908	7·883	**1925**	5	Ap	23	·28	6	My	22	81	1	Je	21	34	2	Jl	20○	·87	4	Au	19	·40
5027	1983	1848	13A	·3481	28·8297	6 016	**1926**	4	My	12	18	5	Je	10	71	7	Jl	10●	21	1	Au	8	·77	3	S	7	30
5028	1984	1849	13A	6068	17·9380	2·173	**1927**	1	My	1	·54	3	My	31○	·07	4	Je	29●	·61	6	Jl	29	·14	7	Au	27	67
5029	1985	1850	12A	·8656	7·0463	25·885	**1928**	5	Ap	19	·91	7	My	19●○	44	1	Je	17	·97	3 5	Jl Au	17 16	·50 ·03	6	S	14	·56
5030	1986	1851	13A	·1243	25·6852	24 018	**1929**	4	My	8●○	·81	6	Je	7	·34	7	Jl	6	·87	2	Au	5	40	3	S	3	·93
5031	1987	1852	13A	3831	14 7935	20·175	**1930**	2	Ap	28	·18	3	My	27	71	5	Je	26	·24	6	Jl	25	·77	1	Au	24	·30
5032	1988	1853	13A	6419	3·9018	16 333	**1931**	6	Ap	17●	·54	1	My	17	·07	2 4	Je Jl	15 15	60 ·13	5	Au	13	·67	7	S	12○	·20
5033	1989	1854	12A	·9006	22·5406	14·467	**1932**	5	My	5	·44	6	Je	3	·97	1	Jl	3	·50	3	Au	2	·04	4	Au	31○	·56
5034	1990	1855	13A	1594	11·6489	10·623	**1933**	2	Ap	24	·81	4	My	24	34	5	Je	22	·87	7	Jl	22	·40	1	Au	20●	93
5035	1991	1856	13A	·4181	0·7572	6·780	**1934**	7 1	Ap My	14 13	·17 ·71	3	Je	12	·24	4	Jl	11○	·77	6	Au	10●	·30	7	S	8	·83
5036	1992	1857	13A	·6769	19·3962	4·914	**1935**	6	My	3	07	7	Je	1	60	2	Jl	1○	·13	3	Jl	30	·66	5	Au	29	·19
5037	1993	1858	12A	·9356	8·5044	1 071	**1936**	3	Ap	21	·44	4	My	20	·97	6	Je	19●○	50	1	Jl	19	·03	2 4	Au S	17 16	·56 ·09
5038	1994	1859	13A	1944	27 1433	26·759	**1937**	2	My	10	·31	3	Je	8	·87	5	Jl	8	·40	6	Au	6	·93	1	S	5	·46
5039	1995	1860	13A	4531	16·2516	22·916	**1938**	6	Ap	29○	·70	1	My	29	·23	2	Je	27	77	4	Jl	27	·30	5	Au	25	·83
5040	1996	1861	13A	·7119	5·3599	19 073	**1939**	4	Ap	19●○	07	5	My	18	60	7	Je	17	·13	1 3	Jl Au	16 15	66 ·19	4	S	13	·72
5041	1997	1862	12A	·9707	23·9988	17·207	**1940**	2	My	6	·97	4	Je	5	50	6	Jl	5	·03	7	Au	3	·56	2	S	2	·09
5042	1998	1863	13A	·2294	13 1071	13·364	**1941**	7	Ap	26	·34	1	My	25	·87	3	Je	24	·40	4	Jl	23	·93	6	Au	22○	·46
5043	1999	1864	13A	4882	2·2154	9·521	**1942**	4	Ap	15	·70	6 7	My Je	15 13	·23 ·76	2	Jl	13	·29	3	Au	11○	83	5	S	10●	·36
5044	2000	1865	13A	·7469	20·8543	7 654	**1943**	3	My	4	·60	5	Je	3	·13	6	Jl	2	·66	1	Au	1○	·19	2	Au	30	·72
5045	2001	1866	13A	·0057	9·9626	3·812	**1944**	7	Ap	22	·97	2	My	22	·50	4	Je	21	·03	5	Jl	20●	·56	7	Au	19	·09
5046	2002	1867	13A	·2644	28 6014	1 945	**1945**	6	My	11	86	1	Je	10○	·39	2	Jl	9●	·93	4	Au	8	46	5	S	6	·99
5047	2003	1868	13A	·5232	17 7097	25 657	**1946**	4	My	1	·23	5	My	30○	·76	7	Je	29●	·29	1	Jl	28	·82	3	Au	27	·35
5048	2004	1869	13A	·7820	6·8180	21·814	**1947**	1	Ap	20	60	3	My	20●○	·13	4	Je	18	·66	6 7	Jl Au	18 16	·19 ·74	2	S	15	·25
5049	2005	1870	13A	·0407	25·4569	19·947	**1948**	7	My	8●	·50	2	Je	7	·03	3	Jl	6	·56	5	Au	5	·09	6	S	3	·62
5050	2006	1871	13A	·2995	14·5652	16·104	**1949**	4	Ap	27●	·86	6	My	27	·39	7	Je	25	·92	2	Jl	25	·45	3	Au	23	99
5051	2007	1872	13A	·5582	3 6735	12 262	**1950**	2	Ap	17	·23	3	My	16	·76	5 6	Je Jl	15 14	·29 ·82	1	Au	13	·35	2	S	11●○	·88
5052	2008	1873	13A	·8170	22 3124	10·395	**1951**	1	My	6	·13	2	Je	4	·66	4	Jl	4	·19	5	Au	2	·72	7	S	1●	·25
5053	2009	1874	13A	·0757	11·4207	6·552	**1952**	5	Ap	24	·49	7	My	24	·03	1	Je	22	·56	3	Jl	22○	·09	4	Au	20●	·62
5054	2010	1875	13A	·3345	0 5290	2·709	**1953**	2 4	Ap My	18 13	·86 ·39	5	Je	11	·92	7	Jl	11●○	45	1	Au	9	·98	3	S	8	·51
5055	2011	1876	13A	·5933	19·1679	0·843	**1954**	1	My	2	·76	3	Je	1	·29	4	Je	30●○	·82	6	Jl	30	·35	7	Au	28	·88
5056	2012	1877	13A	8520	8·2762	24·554	**1955**	6	Ap	22	18	7	My	21	·66	2	Je	20●	·19	3	Jl	19	·72	5 8	Au S	18 16	·25 ·78
5057	2013	1878	13A	1108	26·9151	22 688	**1956**	5	My	10○	·02	6	Je	8	·53	1	Jl	8	·09	2	Au	6	·62	4	S	5	·15
5058	2014	1879	13A	·3695	16·0234	18 845	**1957**	2	Ap	29○	·39	3	My	28	·92	5	Je	27	·45	6	Jl	26	·98	1	Au	25	·51
5059	2015	1880	13A	·6283	5·1317	15·002	**1958**	6	Ap	18●○	·76	1	My	18	·29	2	Je	16	·82	4 5	Jl Au	16 14	·35 ·88	7	S	13	·41
5060	2016	1881	13A	·8870	23·7705	13·185	**1959**	5	My	7	·66	7	Je	6	19	1	Jl	5	·72	3	Au	4	·25	4	S	2○	·73
5061	2017	1882	13A	·1458	12·8788	9·293	**1960**	8	Ap	26	·02	4	My	25	·55	6	Je	24	·08	7	Jl	23	·61	2	Au	22○	·15
5062	2018	1883	13A	·4045	1 9871	5·450	**1961**	7	Ap	15	·39	1 3	My Je	14 13	·92 ·45	4	Jl	12	·98	6	Au	11●○	·51	1	S	10	·04
5063	2019	1884	13A	·6633	20·6260	8·583	**1962**	6	My	4	·29	7	Je	2	·82	2	Jl	2	·85	3	Jl	31●	·88	5	Au	30	41
5064	2020	1885	13A	·9221	9·7343	27·295	**1963**	3	Ap	28	·65	5	My	28	·19	6	Je	21○	·72	1	Jl	21	·25	2	Au	19	·78
5065	2021	1886	13A	·1808	28·3732	25·429	**1964**	2	My	11	·55	4	Je	10○	·08	5	Jl	9●	·61	7	Au	8	·14	1	S	6	·67

N B.—For tithis by other siddhāntas add to the above algebraically as follows :—(1) for Ārya siddhānta + ·06 ; (2) for Brahma siddhānta – ·11 ; and for Siddhānta Śiromaṇi – ·05.

Sūrya siddhānta—*cont.*

Āśvina. Week-day.	Month.	Day.	Fraction.	Kārttika. Week-day.	Month.	Day.	Fraction.	Mārgaśīrsha. Week-day.	Month.	Day.	Fraction.	A.D.	Pauśha. Week-day.	Month.	Day.	Fraction.	A.D.	Māgha. Week-day.	Month.	Day.	Fraction.	Phālguna. Week-day.	Month.	Day.	Fraction.	Chaitra. Week-day.	Month.	Day	Fraction.
7	S	19	·77	2	O	19	·30	3	N	17	·83		5	D	17	36	**15**	6	Jr	15	89	1	F	14●	·43	2	Mr	15	·96
6	O	8	·67	1	N	7	·20	2	D	6	73	**16**	4	Jr	5○	·26		5	F	3●	·79	7	Mr	4	·32	1	Ap	2	·85
4	S	27	·04	5	O	26	·57	7	N	25	·10		1	D	24○	·63	**17**	3	Jr	23●	16	4	F	21	·69	6	Mr	23	22
2	O	15	·93	4	N	14	·47	6	D	14○	·00	**18**	7	Jr	12	53		2	F	11	06	3	Mr	12	·59	5	Ap	11	·12
7	O	5	·30	1	N	3	·83	3	D	3●	36	**19**	4	Jr	1	89		6	Jr	31	42	7	Mr	1	·95	2	Mr	31	·49
4	S	24	·67	6	O	24○	·20	7	N	22●	73		2	D	22	26	**20**	3	Jr	20	79	5	F	19	·32	6	Mr	19	·85
3	O	12○	·57	5	N	11●	·10	6	D	10	63	**21**	1	Jr	9	16		2	F	7	69	4	Mr	9	·22	5	Ap	7●○	·75
7	O	1●○	·93	2	O	31	·46	3	N	29	99		5	D	29	53	**22**	7	Jr	28	06	1	F	26	·59	3	Mr	28●	·12
5	S	21	·30	6	O	20	·83	1	N	19	86		2	D	18	89	**23**	4	Jr	17	42	5	F	15○	·95	7	Mr	17●	·48
4	O	10	·20	5	N	8	·73	7	D	8	26	**24**	1	Jr	6	79		3	F	5○	32	4	Mr	5	·85	6	Ap	4	·88
1	S	28	·57	3	O	28	·10	4	N	26	63		6	D	26	·16	**25**	7	Jr	24●○	69	2	F	23	·22	3	Mr	24	·75
5	S	17	·93	7	O	17	·46	1	N	15	99		3	D	15	52	**26**	5	Jr	4●	05	6	F	12	·59	1 2	Mr Ap	14 12	·12 ·65
4	O	6	·83	6	N	5	·36	7	D	4○	89	**27**	2	Jr	3	42		3	F	1	95	5	Mr	3	·48	7	Ap	2	·01
2	S	26	·20	3	O	25	73	5	N	24○	26		6	D	23	79	**28**	1	Jr	22	32	2	F	20	·85	4	Mr	21	·88
1	O	14	09	2	N	12●○	·63	4	D	12	·16	**29**	5	Jr	10	·69		7	F	9	·22	1	Mr	10	·75	3	Ap	9	·28
5	O	3	·46	6	N	1●	·99	1	D	1	52		3	D	31	·05	**30**	4	Jr	29	58	6	F	28	·11	7	Mr	29○	·65
2	S	22○	83	4	O	22	·36	5	N	20	89		7	D	20	42	**31**	1	Jr	18	95	3	F	17	·48	5	Mr	19○	·01
1	O	11	·73	3	N	10	·26	4	D	9	79	**32**	6	Jr	8	32		7	F	6	85	2	Mr	7○	·38	3	Ap	5	·91
6	S	30	·09	7	O	29	·62	2	N	28	15		3	D	27	69	**33**	5	Jr	26	22	6	F	24●	·75	1	Mr	26	·28
3	S	19	.46	4	O	18	99	6	N	17	·52		1	D	17	05	**34**	2	Jr	15○	58	4	F	14●	·11	5	Mr	15	·64
2	O	8	·36	3	N	6	·89	5	D	6	42	**35**	6	Jr	4○	·95		1	F	3	48	3	Mr	5	·01	4	Ap	3	·54
6	S	27	73	1	O	27	·26	2	N	25	·79		4	D	25○	32	**36**	5	Jr	23	85	7	F	22	·88	1	Mr	22	·91
5	O	15	·62	7	N	14	·15	1	D	13	68	**37**	3	Jr	12	·21		4	F	10	75	6	Mr	12	·28	7	Ap	10	·81
2	O	4	·99	4	N	3○	·52	6	D	3●	·05	**38**	7	Jr	1	·58		2	Jr	31	·11	3	Mr	1	·64	5	Mr	31	·17
7	S	24	·36	1	O	23○	·89	3	N	22●	·42		4	D	21	·95	**39**	6	Jr	20	·48	1	F	19	·01	2	Mr	20	·54
6	O	18○	·25	7	N	11	·79	2	D	11	·32	**40**	3	Jr	9	·85		5	F	8	·88	6	Mr	8	·91	1	Ap	7○	·44
3	O	1●	·62	5	O	31	·15	6	N	29	·68		1	D	29	·21	**41**	2	Jr	27	·74	4	F	26○	·27	5	Mr	27	·81
7	S	20●	·99	2	O	20	·52	4	N	19	·05		5	D	18	·58	**42**	7	Jr	17	·11	1	F	15○	·64	3	Mr	17	·17
6	O	9	·89	1	N	8	·42	2	D	7	·95	**43**	4	Jr	6	·48		6	F	5●○	01	7	Mr	6	·54	2	Ap	5	·07
4	S	29	·25	5	O	28	·78	7	N	27	·31		1	D	26	·85	**44**	3	Jr	25●	38	4	F	28	·91	6	Mr	24	·44
1	S	17	·62	3	O	17	·15	4	N	15	·68		6	D	15○	·21	**45**	7	Jr	18●	·74	2	F	12	·27	3 5	Mr Ap	13 12	·80 ·33
7	O	6	52	2	N	5	·05	3	D	4○	·58	**46**	5	Jr	8	·11		6	F	1	·64	1	Mr	3	·17	2	Ap	1	·70
4	S	25	·82	6	O	25	·41	7	N	23○	·95		2	D	23	·48	**47**	4	Jr	22	·01	5	F	20	·54	7	Mr	22	·07
3	O	14	·78	5	N	13	·31	6	D	12	·84	**48**	1	Jr	11	·37		2	F	9	·90	4	Mr	10	·43	5	Ap	8○	·97
1	O	3○	15	2	N	1●	·68	4	D	1	·21		5	D	30	·74	**49**	7	Jr	29	·27	1	F	27	·80	3	Mr	29○	·38
5	S	22○	·52	7	O	22	·05	1	N	20	·58		3	D	20	·11	**50**	4	Jr	18	·64	6	F	17	·17	7	Mr	18○	·70
4	O	11	·41	5	N	9	·94	7	D	9	·47	**51**	2	Jr	8	·01		3	F	6	·54	5	Mr	8	·07	6	Ap	6	·60
1	S	30	·78	3	O	30	·31	4	N	28	·84		6	D	28	·37	**52**	7	Jr	26○	·90	2	F	25●	·43	3	Mr	25	·96
6	S	19	·15	7	O	18	·68	2	N	17	·21		3	D	16	·74	**53**	5	Jr	15○	·27	6	F	18●	·80	1	Mr	15	·33
5	O	8	·05	6	N	6	·58	1	D	6	·11	**54**	2	Jr	4○	·64		4	F	3	·17	5	Mr	4	·70	7	Ap	3	·23
2	S	27	·41	3	O	26	·94	5	N	25	·47		7	D	25●	·00	**55**	1	Jr	23	·53	3	F	22	·07	4	Mr	23	·60
1	O	16	31	2	N	14○	·84	4	D	14●	·87	**56**	5	Jr	12	·90		7	F	11	·43	1	Mr	11	·96	3	Ap	10	49
5	O	4	·68	7	N	3○	·21	1	D	2●	·74	**57**	3	Jr	1	·27		4	Jr	30	·80	6	Mr	1	·83	7	Mr	30	·86
3	S	24	·04	4	O	23●○	57	6	N	22	·10		7	D	21	·64	**58**	2	Jr	20	·17	3	F	18	·70	5	Mr	20	·23
1	O	12	94	3	N	11	·47	5	D	11	·00	**59**	6	Jr	9	·53		1	F	8	·06	2	Mr	9○	·59	4	Ap	3	·12
6	O	2●	·31	7	O	31	·84	2	N	30	·37		3	D	29	·90	**60**	5	Jr	28	·43	6	F	26○	·96	1	Mr	27	·49
3	S	20●	·68	5	O	20	·21	6	N	18	·74		1	D	18	·27	**61**	2	Jr	16	·80	4	F	15○	·88	5	Mr	16	·86
2	O	9	57	4	N	8	·10	5	D	7	·63	**62**	7	Jr	6	·17		1	F	4●	·70	3	Mr	6	·23	4	Ap	4	·76
6	S	28	·94	1	O	28	·47	3	N	27	·00		4	D	26○	58	**63**	6	Jr	25●	·06	7	F	23	·59	2	Mr	25	·12
4 5	S O	18 17	·31 84	7	N	16	·87	1	D	15○	·90		**Pausha Kshaya**				**64**	3	Jr	14	·43	4	F	12	·96	6 1	Mr Ap	13 12	·49 ·02
3	O	6	·21	4	N	4	·74	6	D	4●○	.27	**65**	7	Jr	2	·80		2	F	1	·33	3	Mr	2	·86	5	Ap	1	·39

Note—From **A.D. 1900** to **A.D. 1999** all eclipses of the sun, visible anywhere in the old world (northern part of eastern hemisphere) are shown. From **1 B.C.** to **A.D. 300** the same observation applies. Between **A.D. 300** and **A.D. 1900** only those eclipses of the sun which are visible in India are entered in this table.

TABLE II.—

Kaliyuga.	Vikrama era	Śaka era.	Commencement of solar year. Month and day A.D	Commencement of solar year. Fraction of day.	First new-moon in solar year.	Anomaly of first new-moon.	Christian era. A.D.	Vaiśākha. Week-day.	Month.	Day.	Fraction.	Jyeṣṭha. Week-day.	Month.	Day.	Fraction.	Āshāḍha. Week-day.	Month.	Day.	Fraction.	Śrāvaṇa. Week-day.	Month.	Day.	Fraction.	Bhādrapada. Week-day.	Month	Day.	Fraction.
5066	2022	1887	13A	·4896	17·4815	21·586	**1965**	6	Ap	30	·92	1	My	30○	·45	2	Je	28	·98	4	Jl	28	·51	6	Au	27	·04
5067	2023	1888	13A	·6983	6·5898	17·743	**1966**	4	Ap	20○	·29	5	My	19●	·82	7	Je	18	·35	1 8	Jl Au	17 16	·88 ·41	4	S	14	·94
5068	2024	1889	13A	·9571	25·2287	15·876	**1967**	3	My	9●	·18	4	Je	7	·71	6	Jl	7	·25	7	Au	5	·78	2	S	4	·31
5069	2025	1890	13A	·2158	14·3370	12·033	**1968**	7	Ap	27	·52	4	My	27	·08	3	Je	25	·61	5	Jl	25	·14	6	Au	23	·67
5070	2026	1891	13A	·4746	3·4453	8·191	**1969**	4	Ap	16	·92	6	My	16	·45	7 2	Je Jl	14 14	·98 ·51	4	Au	13	·04	5	S	11	·57
5071	2027	1892	13A	·7334	22·0842	6·324	**1970**	3	My	5	·82	5	Je	4	·35	6	Jl	3	·88	1	Au	2○	·41	2	Au	31	·94
5072	2028	1893	13A	·9921	11·1925	2·481	**1971**	1	Ap	25	·18	2	My	24	·71	4	Je	23	·24	5	Jl	22●○	·77	7	Au	21	·31
5073	2029	1894	13A	·2509	0·3008	26·198	**1972**	5 7	Ap My	13 13	·55 ·08	1	Je	11	·61	3	Jl	11○	·14	4	Au	9	·67	6	S	8	·20
5074	2030	1895	13A	·5096	18·9396	24·326	**1973**	4	My	2	·45	5	My	31	·98	7	Je	30●	·51	2	Jl	30	·04	3	Au	28	·57
5075	2031	1896	13A	·7684	8·0479	20·483	**1974**	1	Ap	21	·81	3	My	21○	·35	4	Je	19	·88	6	Jl	19	·41	7 2	Au S	17 16	·94 ·47
5076	2032	1897	14A	·0271	26·6868	18·617	**1975**	7	My	10●○	·71	2	Je	9	·24	3	Jl	8	·77	5	Au	7	·30	6	S	5	·83
5077	2033	1898	13A	·2859	15·7951	14·774	**1976**	5	Ap	29●○	·08	6	My	28	·61	1	Je	27	·14	2	Jl	26	·67	4	Au	25	·20
5078	2034	1899	13A	·5447	4·9034	10·931	**1977**	2	Ap	18●	·45	3	My	17	·98	5 7	Je Jl	16 16	·51 ·04	1	Au	14	·57	3	S	13○	·10
5079	2035	1900	13A	·8034	23·5423	9·064	**1978**	1	My	7	·34	2	Je	5	·87	4	Jl	5	·41	5	Au	3	·94	7	S	2○	·47
5080	2036	1901	14A	·0622	12·6506	5·222	**1979**	5	Ap	26	·71	7	My	26	·24	1	Je	24	·77	3	Jl	24	·30	4	Au	22○	·83
5081	2037	1902	13A	·3209	1·7589	1·379	**1980**	3	Ap	15	·08	4 6	My Je	14 13	·61 14	7	Jl	12	·67	2	Au	11	·20	3	S	9	·73
5082	2038	1903	13A	·5797	20·3978	27·067	**1981**	1	My	3	·98	3	Je	2	·51	5	Jl	2○	·04	6	Jl	31●	·57	1	Au	30	·10
5083	2039	1904	13A	·8384	9·5061	23·224	**1982**	6	Ap	23	·34	7	My	22	·87	2	Je	21○	·40	3	Jl	20●	·93	5	Au	19	·47
5084	2040	1905	14A	·0972	28·1450	21·357	**1983**	5	My	12	·24	6	Je	10●○	·77	1	Jl	10	·30	2	Au	8	·83	4	S	7	·36
5085	2041	1906	13A	·3559	17·2538	17·514	**1984**	2	Ap	30	·61	4	My	30●	14	5	Je	28	·67	7	Jl	28	·20	1	Au	26	·73
5086	2042	1907	13A	·6147	6·3616	13·672	**1985**	6	Ap	19○	·97	1	My	19	·51	3	Je	18	·04	4 6	Jl Au	17 16	·57 ·10	7	S	14	·63
5087	2043	1908	13A	·8735	25·0004	11·805	**1986**	5	My	8	·87	7	Je	7	·40	1	Jl	6	·93	3	Au	5	·46	4	S	3	·99
5088	2044	1909	14A	·1322	14·1087	7·962	**1987**	3	Ap	28	·24	4	My	27	·77	6	Je	26	·30	7	Jl	25	·83	2	Au	24	·36
5089	2045	1910	13A	·3910	3·2170	4·119	**1988**	7	Ap	16	·61	2 3	My Je	16 14	·14 ·67	5	Jl	14	·20	6	Au	12○	·73	1	S	11●	·26
5090	2046	1911	13A	·6497	21·8559	2·253	**1989**	6	My	5	·50	1	Je	4	·03	2	Jl	3	·57	4	Au	2○	·10	5	Au	31	·63
5091	2047	1912	13A	·9085	10·9642	25·965	**1990**	3	Ap	24	·87	5	My	24	·40	6	Je	22	·93	1	Jl	22●○	·46	2	Au	20	·99
5092	2048	1913	14A	·1672	0·0725	22·122	**1991**	1 2	Ap My	14 13	·24 ·77	4	Je	12	·30	5	Jl	11	·83	7	Au	10	·36	1	S	8	·89
5093	2049	1914	13A	·4260	18·7114	20·255	**1992**	7	My	2	·14	1	My	31○	·67	3	Je	30	·20	4	Jl	29	·73	6	Au	28	·26
5094	2050	1915	13A	·6848	7·8197	16·412	**1993**	4	Ap	21	·50	6	My	21●○	·03	7	Je	19	·56	2	Jl	19	·09	3 5	Au S	17 16	·63 ·16
5095	2051	1916	13A	·9435	26·4586	14·546	**1994**	3	My	10●○	·40	4	Je	8	·93	6	Jl	8	·46	7	Au	6	·99	2	S	5	·52
5096	2052	1917	14A	·2023	15·5669	10·703	**1995**	7	Ap	29●	·77	2	My	29	·30	3	Je	27	·83	5	Jl	27	·36	6	Au	25	·89
5097	2053	1918	13A	·4610	4·6752	6·860	**1996**	5	Ap	18	·13	6	My	17	·67	1 2	Je Jl	16 15	·20 ·73	4	Au	14	·26	5	S	12○	·79
5098	2054	1919	13A	·7198	23·3141	4·993	**1997**	4	My	7	·08	5	Je	5	·56	7	Jl	5	·09	1	Au	3	·62	3	S	2○	·15
5099	2055	1920	13A	·9785	12·4224	1·151	**1998**	1	Ap	26	·40	2	My	25	·93	4	Je	24	·46	5	Jl	23	·99	7	Au	22●	·52
5100	2056	1921	14A	·2373	1·5307	24·862	**1999**	5	Ap	15	·77	7 1	My Je	15 13	·30 ·83	3	Jl	13○	·36	4	Au	11●	·89	6	S	10	·42

N.B.—For tithis by other siddhāntas add to the above algebraically as follows :—

Sūrya siddhānta.—*cont.*

Āśvina.				Kārttika.				Mārgaśirsha.				A.D.	Pausha.				A.D.	Māgha.				Phālguna.				Chaitra.			
Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction		Week-day.	Month.	Day.	Fraction.		Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.	Week-day.	Month.	Day.	Fraction.
7	S	25	·57	2	O	25	·10	3	N	23●	·63		5	D	23	·16	66	6	Jr	21	·69	1	F	20	·23	2	Mr	21	·76
6	O	14○	·47	1	N	13●	·00	2	D	12	·53	67	4	Jr	11	·06		5	F	9	·59	7	Mr	11	·12	1	Ap	9○	·65
3	O	3○	·84	5	N	2	·37	6	D	1	·90		1	D	31	·43	68	2	Jr	29	·96	4	F	28	·49	6	Mr	29○	·02
1	S	22○	·20	2	O	21	·73	4	N	20	·27		5	D	19	·80	69	7	Jr	18	33	1	F	16	·86	3	Mr	18●	39
7	O	11	·10	1	N	9	·63	3	D	9	·16	70	4	Jr	7	·69		6	F	6○	·22	7	Mr	7●	·75	2	Ap	6	·29
4	S	30	·47	6	O	30	·00	7	N	28	·53		2	D	28	·06	71	3	Jr	26○	·59	5	F	25●	·12	6	Mr	26	·65
1	S	19	·84	3	O	19	·37	4	N	17	·90		6	D	17	·43	72	7	Jr	15○	·96	2	F	14	·49	4	Mr	15	·02
7	O	7	·73	2	N	6	·26	3	D	5	·79	73	5	Jr	4●	·33		6	F	2	86	1	Mr	4	·39	2	Ap	2	·92
5	S	27	·10	6	O	26	·63	1	N	25○	·16		2	D	24●	·69	74	4	Jr	23	·23	5	F	21	·75	7	Mr	23	·28
4	O	16	·00	5	N	14○	·53	7	D	14●	·06	75	1	Jr	12	·59		3	F	11	·12	4	Mr	12	·65	6	Ap	11	18
1	O	5	·37	2	N	3○	·90	4	D	3	·43	76	5	Jr	1	·96		7	Jr	31	·49	2	Mr	1	·02	3	Mr	30	·55
5	S	23	·73	7	O	28●	·26	1	N	21	·79		3	D	21	·32	77	4	Jr	19	·85	6	F	18	·39	7	Mr	19○	·92
4	O	12	·63	6	N	11	·16	7	D	10	·69	78	2	Jr	9	·22		3	F	7	·75	5	Mr	9○	·28	6	Ap	7	·81
2	O	2●	·00	3	O	31	·53	5	N	30	·06		6	D	29	·59	79	1	Jr	28	·12	2	F	26●○	·65	4	Mr	28	·18
6	S	21	·36	7	O	20	·89	2	N	19	·43		3	D	18	·96	80	5	Jr	17	·49	7	F	16●	·02	1	Mr	16	·55
5	O	9	·26	6	N	7	·79	1	D	7	·32	81	2	Jr	5	·85		4	F	4	·38	5	Mr	5	·91	7	Ap	4	45
2	S	28	·63	4	O	28	·16	5	N	26	·69		7	D	26○	·22	82	1	Jr	24	·75	3	F	23	·28	4	Mr	24	·81
{7	S	18	·00	3	N	16	·06	4	D	15●○	·59	83	6	Jr	14	·12		Māgha				{7	F	12	·65	3	Ap	12	·71
{1	O	17	·58															Kshaya				{2	Mr	14	·18				
5	O	6	·89	7	N	5	·42	1	D	4●	·95	84	3	Jr	3	·49		5	F	2	·02	6	Mr	2	·55	1	Ap	1	·08
3	S	25	·26	4	O	24	·79	6	N	23	·32		7	D	22	·85	85	2	Jr	21	·38	3	F	19	·91	5	Mr	21	·44
2	O	14○	·16	3	N	12●	·69	5	D	12	·22	86	6	Jr	10	·75		1	F	9	·28	2	Mr	10	·81	4	Ap	9○	·34
6	O	3○	·53	1	N	2	·06	2	D	1	·59		4	D	31	·12	87	5	Jr	29	·65	7	F	28	·18	1	Mr	29●	·71
3	S	22●	·89	5	O	22	·42	6	N	20	·95		1	D	20	·48	88	3	Jr	19	·01	4	F	17	·55	6	Mr	18●	·08
2	O	10	·79	4	N	9	·32	5	D	8	·85	89	7	Jr	7	·38		1	F	5○	·91	3	Mr	7	·44	4	Ap	5	·97
7	S	30	·16	1	O	29	·69	3	N	28	·22		4	D	27	·75	90	6	Jr	26○	·28	7	F	24	·81	2	Mr	26	·34
4	S	19	·52	6	O	19	·05	7	N	17	·59		2	D	17	·12	91	3	Jr	15○	·65	5	F	14	·18	6	Mr	15	·71
3	O	8	·42	4	N	6	·95	6	D	6○	·48	92	1	Jr	5	·01		2	F	3	·54	4	Mr	4	·07	5	Ap	2	·61
7	S	26	·79	2	O	26	·32	3	N	24○	·85		5	D	24●	·38	93	6	Jr	22	·91	1	F	21	·44	2	Mr	22	·97
6	O	15	·69	1	N	14○	·22	2	D	13	·75	94	4	Jr	12	·28		5	F	10	·81	7	Mr	12	·34	1	Ap	10	·87
4	O	5	·05	5	N	3●	·58	7	D	3	·11	95	1	Jr	1	·65		3	Jr	31	·18	4	Mr	1	·71	6	Mr	31○	·24
1	S	24	·42	2	O	23●	·95	4	N	22	·48		6	D	22	·01	96	7	Jr	20	·54	2	F	19	·07	3	Mr	19○	·60
7	O	12●	·32	1	N	10	·85	3	D	10	·38	97	4	Jr	8	·91		6	F	7	·44	7	Mr	8●	·97	2	Ap	7	·50
4	O	1	·69	6	O	31	·22	7	N	29	·75		2	D	29	·28	98	3	Jr	27	·81	5	F	26●	·34	6	Mr	27	·87
2	S	21	·05	3	O	20	·58	5	N	19	·11		6	D	18	·64	99	1	Jr	17	·17	2	F	15●	71	4	Mr	17	·24
7	O	9	·95	2	N	8	·48	4	D	8	·01	20	5	Jr	6○	·54	00	7	F	5	·07	1	Mr	5	·60	3	Ap	4	·13

(1) for Ārya siddhānta +·07; (2) for Brahma siddhānta −·12; and (3) for Siddhānta Śiromaṇi −·05.

TABLE III.—Sunrise from 8° to 12° N. latitude.

Day of solar year.	Lat. 8° Eqn. of time in seconds.	Lat. 8° ⊙'s trop. long. in seconds.	Long. +300″ =+ ·008 of day. Total correctn. as fraction of a day. **Trivandrum** A.D. 1000–1400.	Lat. 9° Eqn. of time in seconds.	Lat. 9° ⊙'s trop. long in seconds.	Long. +852″ =+ ·010 of day. Total correctn. as fraction of a day. **Ramesvaram** A.D. 1000–1400	Lat. 10° Eqn. of time in seconds.	Lat. 10° ⊙'s trop. long. in seconds	Long. +564″ =·007 of day. Total correctn. as fraction of a day. **Madura.** A.D. 1000–1400.	Lat. 11° Eqn. of time in seconds.	Lat. 11° ⊙'s trop long. in seconds	Long +816″ =·009 of day. Total correctn. as fraction of a day. **Tanjore.** A.D 1000–1400.	Eng. date.	Lat. 12° Eqn. of time in seconds	Lat. 12° ⊙'s trop. long. in seconds.	Long. + 212″ =+ ·002 of day. Total correctn. as fraction of a day. **Maisur.** A.D. 1000–1400.
1	—447	+31	+·003	—443	+32	+ 009	—439	+34	+ 006	—435	+36	+·009	25	—431	+38	+·003
2	445	61	...	441	65	...	437	68	...	433	72	+·010	March. 26	429	75	...
3	443	92	...	439	97	...	435	102	+·007	431	108	...	27	428	113	+·004
4	440	123	...	436	130	+·010	433	136	...	430	144	...	28	426	150	...
5	438	153	..	434	162	...	431	170	...	428	179	...	29	424	188	...
6	436	184	+·004	432	194	+·011	429	205	+ 008	426	215	..	30	422	226	+·005
7	434	215	+ 005	430	227	...	427	239	..	421	251	+·012	31	420	263	...
8	433	245	...	429	259	...	425	273	+·009	421	287	...	1	418	301	+·006
9	429	276	+·006	425	292	+·012	422	307	...	419	323	+·013	2	415	338	...
10	428	307	...	424	324	...	420	341	+·010	416	359	...	3	413	376	+·007
11	425	337	...	421	356	...	417	375	...	413	395	...	4	410	414	...
12	421	368	..	417	389	+ 013	414	409	...	411	431	..	5	407	451	...
13	418	399	+·007	414	421	...	411	443	...	408	467	+·015	6	404	489	...
14	415	429	...	411	454	...	408	477	...	405	503	...	7	401	526	+·009
15	413	460	..	409	486	...	405	511	...	401	538	...	8	398	564	...
16	409	491	+·008	405	518	...	402	546	+·012	398	574	..	9	395	602	...
17	405	521	...	401	551	...	398	580	..	395	610	+·016	10	391	639	...
18	402	552	..	398	583	+·016	395	614	...	391	646	...	11	388	678	+·010
19	398	583	+·009	394	616	...	391	648	...	388	682	...	12	384	715	...
20	394	613	...	390	648	...	387	682	...	384	718	...	13	381	753	...
21	390	644	...	386	680	...	383	716	+·014	380	754	...	April. 14	377	791	...
22	387	675	+·010	382	713	...	379	750	...	376	790	+·018	15	373	828	...
23	384	705	...	379	745	+·017	375	784	...	372	826	...	16	371	867	+·012
24	381	736	...	377	778	...	373	818	...	370	862	...	17	369	903	...
25	378	767	+·011	374	810	...	370	852	...	368	897	...	18	367	941	...
26	375	797	.	372	842	...	368	887	+·015	366	933	+·019	19	365	979	...
27	372	828	...	369	875	..	365	921	...	364	969	...	20	363	1016	+·013
28	369	859	...	367	907	...	363	955	...	362	1005	...	21	360	1053	...
29	366	889	...	364	940	+·018	360	989	...	359	1041	...	22	358	1091	...
30	363	920	...	362	972	...	358	1024	...	357	1076	...	23	356	1128	...
31	360	931	+·012	360	984	...	356	1038	+·016	354	1091	+·020	24	353	1144	.
32	357	941	...	357	996	...	354	1052	...	352	1107	...	25	351	1161	+·014
33	354	952	...	355	1009	...	352	1065	..	350	1122	...	26	348	1177	...
34	351	963	...	353	1021	...	350	1079	...	348	1138	...	27	346	1194	...
35	348	973	...	350	1033	+·020	348	1093	...	346	1153	...	28	344	1210	...
36	346	984	...	344	1045	...	342	1107	+·018	340	1168	+·021	29	338	1227	+·015
37	340	995	+·013	338	1058	...	336	1121	...	334	1184	...	30	332	1243	...
38	334	1006	...	332	1070	...	330	1134	...	328	1199	...	1	326	1260	...
39	328	1016	...	326	1082	...	324	1148	...	322	1215	...	2	320	1276	...
40	321	1027	...	319	1095	+·021	317	1162	...	315	1230	+·022	3	313	1293	+·016
41	315	1038	...	313	1107	...	311	1176	..	309	1245	...	4	307	1309	...
42	308	1048	.	306	1119	...	304	1190	...	302	1261	...	5	300	1326	...
43	301	1059	...	299	1131	...	297	1203	...	295	1276	...	6	294	1342	...
44	295	1070	...	293	1144	...	291	1217	+·020	289	1282	...	7	287	1359	...
45	288	1081	...	286	1156	...	284	1231	+·019	282	1307	...	8	280	1375	...
46	281	1091	...	279	1168	...	277	1245	...	275	1322	...	9	274	1392	...
47	274	1102	...	272	1180	+·022	270	1259	...	268	1338	+·024	10	267	1408	...
48	267	1113	...	265	1193	...	263	1272	...	261	1353	...	11	260	1425	...
49	260	1123	...	258	1205	...	256	1286	...	254	1369	...	May. 12	253	1441	+·018
50	252	1134	...	250	1217	...	248	1300	...	247	1384	...	13	245	1458	...
51	245	1145	...	243	1229	...	241	1314	...	240	1399	...	14	238	1474	...
52	238	1156	...	236	1242	...	234	1328	...	232	1415	...	15	231	1491	...
53	230	1166	...	228	1254	...	226	1341	...	225	1430	...	16	223	1507	...
54	223	1177	+·014	221	1266	...	219	1355	...	217	1446	...	17	216	1524	...
55	215	1188	...	213	1278	...	211	1369	...	210	1461	...	18	208	1540	...
56	208	1198	...	206	1291	...	204	1383	...	202	1476	...	19	201	1557	...
57	199	1209	...	197	1303	...	195	1397	...	194	1492	...	20	193	1573	..
58	194	1220	...	192	1315	...	190	1410	...	190	1507	...	21	189	1590	...
59	189	1231	...	187	1327	...	186	1424	...	186	1523	...	22	185	1606	...
60	184	1241	...	182	1340	...	182	1438	...	182	1528	...	23	181	1623	...
61	179	1252	...	178	1352	...	178	1452	...	178	1552	...	24	177	1640	...
62	174	1239	...	174	1339	+·021	174	1440	...	174	1540	+·023	25	174	1629	...

TABLE III.—Sunrise from 8° to 12° N. latitude—cont.

Day of solar year.	Lat. 8° Eqn. of time in seconds.	Lat. 8° ☉'s trop. long. in seconds.	Long. +800″ =+·008 of day. Total correctn. as fraction of a day. **Trivandrum.**	Lat. 9° Eqn. of time in seconds.	Lat. 9° ☉'s trop. long. in seconds.	Long. +852″ =+·010 of day. Total correctn. as fraction of a day. **Ramesvaram**	Lat. 10° Eqn. of time in seconds.	Lat. 10° ☉'s trop. long. in seconds.	Long. +564″ =+ ·007 of day. Total correctn. as fraction of a day. **Madura.**	Lat. 11° Eqn. of time in seconds.	Lat. 11° ☉'s trop. long. in seconds.	Long +816″ =+ ·009 of day. Total correctn as fraction of a day. **Tanjore.**	**Eng. date.**	Lat. 12° Eqn. of time in seconds.	Lat. 12° ☉'s trop. long. in seconds.	Long. +212″ =+ ·002 of day. Total correctn as fraction of a day. **Maisur.**
			A.D. 1000—1400.			**A.D.** 1000—1400.			**A.D.** 1000—1400.			**A.D.** 1000—1400.				**A.D.** 1000—1400.
63	−165	+1226	+·014	−165	+1827	+·021	−165	+1427	+·019	−165	+1528	+·023	May. **26**	−165	+1617	+·018
64	156	1214	...	156	1314	..	156	1415	...	156	1516	...	**27**	156	1606	...
65	147	1201	...	147	1302	...	147	1402	...	147	1504	...	**28**	147	1595	
66	188	1188	...	188	1289	...	138	1390	...	138	1492	...	**29**	188	1588	...
67	129	1176	...	129	1277	...	129	1378	...	129	1481	. .	**30**	128	1572	...
68	120	1163		120	1264	..	120	1365	...	119	1469	...	**31**	119	1561	...
69	110	1150	...	110	1252	...	110	1353	...	110	1459	...	**1**	110	1550	+·017
70	101	1187	...	101	1239	...	101	1340	...	101	1445	...	**2**	100	1538	...
71	91	1125	+·013	91	1227	...	91	1328	...	91	1433	...	**3**	91	1527	...
72	82	1112	..	82	1214	...	82	1316	...	82	1421	...	**4**	81	1516	...
73	72	1099	...	72	1202	...	72	1308	...	72	1409	...	**5**	72	1504	...
74	63	1086	...	63	1189	..	63	1291	...	63	1397	.	**6**	62	1498	...
75	54	1074	...	54	1176	...	54	1278	...	54	1385	..	**7**	54	1482	...
76	48	1061	...	43	1164	...	43	1266	...	43	1378	...	**8**	43	1470	...
77	34	1048	...	34	1151	...	31	1254	...	34	1362	...	**9**	34	1459	...
78	25	1035	...	25	1139	...	25	1241	...	25	1350	...	**10**	24	1448	...
79	15	1028	...	15	1126	...	15	1229	...	15	1338	..	**11**	15	1437	...
80	5	1010	...	5	1114	...	5	1216	.	5	1326	...	**12**	5	1425	...
81	+4	997	...	+4	1101	. .	+4	1204	+·018	+4	1314	...	**13**	+4	1414	...
82	14	985	...	14	1089		14	1192	...	14	1302	+·022	**14**	14	1408	...
83	28	972	...	23	1076	...	23	1179	...	23	1290	...	June. **15**	23	1391	...
84	33	959	...	33	1064	...	88	1167	...	83	1278	...	**16**	33	1380	...
85	43	946	...	43	1051	...	43	1154	...	43	1266	...	**17**	48	1369	...
86	52	934	...	52	1039	..	52	1142	...	52	1254	...	**18**	52	1357	...
87	61	921	...	61	1026	...	61	1130	...	61	1243	...	**19**	61	1846	...
88	71	908	.	71	1014	...	71	1117	...	71	1281		**20**	71	1385	...
89	81	895	...	81	1001	+·020	81	1105	...	81	1219	+·021	**21**	81	1324	+·016
90	90	883	...	90	988	...	90	1092	...	90	1207	...	**22**	90	1312	...
91	104	870	...	104	976	...	104	1080	...	104	1196	...	**23**	104	1300	...
92	114	847	+·012	114	953	...	114	1057	...	114	1173	...	**24**	114	1276	...
93	124	825	...	124	931	...	124	1034	...	124	1149	...	**25**	124	1252	...
94	133	802	...	133	908	.	133	1012	+·017	134	1126	...	**26**	134	1228	...
95	148	780	...	143	885	+·018	143	989	...	143	1103	...	**27**	144	1204	...
96	153	757	...	158	862	...	158	966	...	158	1079	. .	**28**	153	1180	+·015
97	162	735	...	162	840	..	162	943	...	163	1056	..	**29**	168	1157	...
98	172	712	+·011	172	817	...	172	920	...	172	1033	...	**30**	173	1133	...
99	182	690	...	182	704	...	182	898		182	1010	...	**1**	182	1109	...
100	191	667	...	191	772	...	191	875	...	191	986	...	**2**	191	1085	...
101	200	645		200	749	...	200	852	+ 016	200	963	...	**3**	201	1061	...
102	209	622	...	209	726	+·017	209	829	...	210	940	+·020	**4**	210	1037	+·014
103	218	600	...	218	703		218	806	...	219	916	...	**5**	219	1018	...
104	228	577	...	228	681	...	228	784	...	228	893	...	**6**	229	989	...
105	237	555	+·010	237	658	...	237	761	...	237	870	...	**7**	238	965	...
106	246	532	..	246	635	...	246	738	...	246	846	...	**8**	247	941	...
107	258	510	...	253	613	..	254	715	...	255	823	...	**9**	256	918	...
108	261	487	...	262	590	...	268	692	...	264	800	...	**10**	265	894	...
109	271	465	...	272	567	...	272	670	...	273	777	...	**11**	273	870	...
110	280	442	...	280	544		281	647	...	281	753	..	**12**	282	846	...
111	288	420	...	289	522	..	289	624	...	290	730	...	**13**	290	822	...
112	297	397	...	297	499	..	298	601	...	298	707	...	**14**	299	798	...
113	806	375	+·009	806	476	...	306	578	..	307	683	...	**15**	307	774	+·012
114	315	352	...	315	454	...	815	556	...	816	660	...	**16**	316	750	...
115	323	330	...	323	431	...	328	533	..	324	637	+ 018	July. **17**	324	726	...
116	331	307	...	331	408	...	831	510	...	332	613	...	**18**	832	702	...
117	338	285		339	385	..	339	487	...	339	590	..	**19**	340	679	...
118	347	262	...	347	363	...	347	464	+·014	348	567	...	**20**	348	655	...
119	853	239	...	354	340	...	354	442	...	355	544	...	**21**	356	631	...
120	356	217	...	357	817	...	358	419	..	359	520	...	**22**	360	607	...
121	359	194	...	360	295	..	362	396	...	363	497	...	**23**	364	583	...
122	362	172	...	363	272	...	366	372	...	367	472	...	**24**	369	560	...
123	365	162	...	367	261	+·015	369	359	...	371	457	...	**25**	374	544	+·011
124	372	152	...	374	249	...	376	346	...	379	443	.	**26**	380	529	...
125	379	143	...	381	238	...	383	338	...	385	428	+·017	**27**	387	513	...

TABLE III.—Sunrise from 8° to 12° N. latitude—*cont.*

Day of solar year.	Lat. 8° Eqn. of time in seconds.	Lat. 8° ☉'s trop. long. in seconds.	Long. +300″ =+·003 of day. Total correctn. as fraction of a day. **Trivandrum.** A.D. 1000—1400.	Lat. 9° Eqn. of time in seconds.	Lat. 9° ☉'s trop long. in seconds.	Long. +852″ =+·010 of day. Total correctn as fraction of a day. **Ramesvaram** A.D. 1000—1400.	Lat. 10° Eqn. of time in seconds.	Lat. 10° ☉'s trop. long in seconds	Long. +564″ =+·007 of day. Total correctn. as fraction of a day **Madura** A.D. 1000—1400.	Lat. 11° Eqn. of time in seconds.	Lat. 11° ☉'s trop. long. in seconds.	Long. +816″ =+·009 of day. Total correctn. as fraction of a day. **Tanjore.** A.D. 1000—1400.	Eng. date.	Lat. 12° Eqn. of time in seconds.	Lat. 12° ☉'s trop. long. in seconds.	Long. +212″ =+·002 of day. Total correctn. as fraction of a day. **Maisur.** A.D. 1000—1400.
126	+385	+133	+·009	+387	+227	+·015	+389	+320	+·014	+392	+414	+·017	**28**	+394	+497	+·011
127	390	123		393	215	.	396	307	...	399	399	...	July. **29**	401	481	.
128	396	114	...	399	204	.	402	295	...	405	385	...	**30**	407	466	...
129	405	104	..	407	193	...	409	282	...	411	370	...	**31**	413	450	...
130	409	94	...	412	181	...	415	269	...	418	356	..	**1**	420	434	...
131	415	84		418	170	...	421	256	.	424	341	...	**2**	426	419	..
132	421	75	.	424	159	..	427	243	.	430	327	...	**3**	432	408	+·010
133	427	65	...	430	147	...	433	230	+·018	436	312	...	**4**	438	387	...
134	434	55	.	437	136	..	439	217	...	441	298	...	**5**	444	372	...
135	438	45	...	441	125	...	444	204		447	288	...	**6**	449	356	...
136	444	36	...	447	113	...	450	191	...	453	269	...	**7**	455	340	...
137	449	26	..	452	102	...	455	178	.	458	254	...	**8**	460	324	...
138	454	16	...	457	91	...	460	166	...	463	240	...	**9**	465	309	...
139	461	6	...	464	79	...	466	153	...	468	225	...	**10**	471	293	...
140	464	0	...	467	68	.	470	140	.	473	211	...	**11**	475	277	...
141	469	0	...	472	57		475	127	.	478	196	...	**12**	480	262	..
142	474	0	.	477	45	...	480	114	.	483	182	.	**13**	485	246	...
143	478	0	...	481	34	.	484	101	...	487	167	..	**14**	490	230	...
144	483	0	...	486	23	.	489	88	...	490	153	...	**15**	494	215	...
145	484	0	..	487	11	...	490	75	...	492	138	...	**16**	497	199	...
146	486	0	...	488	0	...	491	62	...	494	124	...	August. **17**	500	183	...
147	487	0	. .	490	0	...	493	49	.	495	109	...	**18**	502	167	...
148	489	0	..	491	0		494	37	...	496	95	.	**19**	504	152	...
149	490	0	...	492	0	...	495	24	. .	497	80	...	**20**	506	136	...
150	491	0	..	494	0		496	11	...	499	66	...	**21**	507	120	...
151	492	0	...	495	0		498	0	...	500	51	...	**22**	508	105	...
152	494	0	...	496	0		499	0		501	36	..	**23**	509	88	...
153	495	0	...	497	0		500	0	. .	502	35	...	**24**	510	85	...
154	496	0	. .	498	0	...	501	0	..	503	34	.	**25**	511	82	...
155	498	0	...	499	0	.	502	0	...	504	32	..	**26**	512	80	...
156	500	0	...	500	0	...	503	0		506	31	..	**27**	513	77	.
157	501	0	..	501	0	..	504	0	..	508	30	...	**28**	514	74	...
158	502	0	...	503	0	...	506	0	.	510	29	...	**29**	515	71	...
159	503	0	...	505	0	...	508	0	..	512	28	...	**30**	516	68	...
160	504	0	...	507	0	...	510	0	...	514	26	...	**31**	518	66	...
161	505	0	.	509	0	...	512	0	...	515	25	...	**1**	519	63	...
162	506	0	...	510	0	...	513	0		517	24	...	**2**	520	60	...
163	508	0	...	512	0	...	514	0	...	518	23	...	**3**	522	57	+·008
164	509	0	...	513	0	.	516	0	.	520	22	...	**4**	524	54	...
165	510	0	...	514	0	...	517	0	...	521	20	...	**5**	525	52	...
166	511	0	...	515	0		517	0	...	521	19	...	**6**	525	49	...
167	512	0	...	515	0	...	519	0	...	522	18	...	**7**	526	46	...
168	513	0	..	516	0	...	519	0	...	523	17	...	**8**	527	43	...
169	513	0	..	516	0	...	520	0	...	524	16	...	**9**	527	40	...
170	513	0		516	0	..	520	0	...	524	14	...	**10**	528	38	...
171	514	0	...	517	0	...	521	0	...	524	13	.	**11**	528	35	...
172	515	0	...	518	0	...	521	0	..	525	12	..	September. **12**	528	32	...
173	515	0	...	518	0	...	521	0	...	524	11	...	**13**	528	29	...
174	514	0	...	517	0	.	520	0	..	524	10	...	**14**	528	26	...
175	513	0	...	516	0	...	520	0	.	524	8	...	**15**	527	24	...
176	512	0	...	516	0	...	520	0	...	523	7	...	**16**	527	21	...
177	511	0	..	515	0	...	519	0	...	523	6	...	**17**	526	18	...
178	510	0	...	514	0	...	518	0	...	522	5	...	**18**	525	15	...
179	509	0	.	513	0		517	0	...	521	4	.	**19**	525	12	...
180	508	0	...	512	0	...	516	0	+·012	520	2	...	**20**	524	10	...
181	507	0	...	511	0	...	514	0	...	518	1	...	**21**	522	7	...
182	506	0	...	510	0	..	513	0		517	0	...	**22**	521	4	...
183	505	0	.	509	0	...	512	0	...	515	0	...	**23**	519	0	...
184	504	0	...	508	0	..	511	0	...	514	−1	...	**24**	518	−3	...
185	503	0	...	506	0	...	509	0	...	512	2	...	**25**	516	6	...
186	501	0	...	504	0	...	507	0	..	510	4	...	**26**	514	9	...

TABLE III.—Sunrise from 8° to 12° N. latitude—*cont.*

Day of solar year.	Lat. 8°: Eqn. of time in seconds.	Lat. 8°: ☉'s trop. long. in seconds.	Long. +·300″ =+·003 of day. Total correctn. as fraction of a day. **Trivandrum.** A.D. 1000–1400.	Lat. 9°: Eqn. of time in seconds.	Lat. 9°: ☉'s trop. long. in seconds.	Long. +852″ =+·010 of day. Total correctn. as fraction of a day. **Rameswaram** A.D. 1000–1400.	Lat. 10°: Eqn. of time in seconds.	Lat. 10°: ☉'s trop. long. in seconds.	Long. +564″ =+·007 of day. Total correctn. as fraction of a day. **Madura.** A.D. 1000–1400.	Lat. 11°: Eqn. of time in seconds.	Lat. 11°: ☉'s trop. long. in seconds	Long. +816″ =+·009 of day. Total correctn. as fraction of a day. **Tanjore.** A.D. 1000–1400.	**Eng. date.**	Lat. 12°: Eqn. of time in seconds.	Lat. 12°: ☉'s trop long. in seconds.	Long. +212″ =+·002 of day. Total correctn. as fraction of a day. **Maisur.** A.D. 1000–1400
187	+499	+0	+·009	+502	+0	+·015	+505	+0	+·013	+508	−5	+·016	**27**	+512	−12	+·008
188	497	0	...	500	0	..	503	0	.	506	6	...	Sep. **28**	510	14	
189	494	0	...	497	0	...	500	0	...	503	7	...	**29**	507	17	+·007
190	491	0		494	0	...	497	0	..	500	8	...	**30**	504	20	...
191	488	0	..	491	0	...	494	0	...	497	10	...	**1**	501	23	...
192	485	0	..	488	0		491	0	...	494	11	...	**2**	498	26	...
193	482	0	...	485	0		488	0		491	12		**3**	495	29	...
194	479	0	..	482	0	...	485	0	...	488	13	..	**4**	492	32	...
195	476	0	...	479	0	...	482	0		485	14	+·015	**5**	489	35	..
196	473	0	...	476	0	..	479	0	...	482	16	.	**6**	486	38	
197	469	0	...	472	0	...	475	0	...	478	17	...	**7**	482	41	...
198	465	0	...	468	0	...	471	0	+·012	474	18	...	**8**	478	43	
199	462	0	...	465	0	...	468	0	...	471	19	+·014	**9**	475	46	..
200	458	0	.	461	0	.	464	0	...	467	20	.	**10**	471	49	..
201	454	0	...	457	0	...	460	0	...	463	22		**11**	467	52	+·006
202	450	0	.	453	0	...	456	0		459	23	...	October. **12**	463	55	...
203	445	0	..	448	0	...	451	0	+·011	454	24	...	**13**	458	58	
204	440	0	...	443	0	..	446	0		449	25	+·013	**14**	453	61	...
205	436	0	...	439	0	...	442	0		445	26	...	**15**	449	64	+·005
206	431	0	..	434	0	...	437	0	...	440	28	...	**16**	444	67	..
207	427	0	...	430	0		433	0		436	29	..	**17**	440	70	...
208	422	0	...	425	0	...	428	0	+·010	431	30	+·012	**18**	435	72	..
209	417	0	...	420	0	+·014	423	0	...	425	31	..	**19**	429	75	+·004
210	413	0	.	416	0	...	419	0		420	32	..	**20**	424	78	.
211	411	0	...	414	0	..	417	0	...	418	34		**21**	422	81	...
212	409	0	+·008	412	0	...	415	0	...	416	35	...	**22**	420	84	...
213	407	0	...	410	0	...	413	0	...	414	36	...	**23**	418	88	...
214	405	0	...	408	0	...	411	0	+·009	412	50	...	**24**	416	104	...
215	403	0	...	406	0	...	409	−10	.	410	65	...	**25**	414	120	..
216	397	0	..	400	0	...	403	23	.	406	79	...	**26**	408	135	...
217	391	0	...	394	0	...	397	36	..	400	94	...	**27**	402	151	..
218	385	0	...	388	0	...	391	48	...	394	108	+·011	**28**	396	166	+·003
219	378	0	...	381	0	...	384	61	+·008	387	123	...	**29**	389	182	...
220	372	0	...	375	−11	+·012	+378	74		381	137	..	**30**	383	198	...
221	365	0	...	368	23	.	371	87	.	374	152	..	**31**	376	214	
222	358	0	...	361	34	...	366	100	...	367	166	+·010	**1**	369	229	+·002
223	351	0	...	354	45	..	357	113	...	360	181	...	**2**	362	245	.
224	344	0	+·007	347	57		350	126	..	353	195	...	**3**	355	261	...
225	337	0	..	340	68	...	343	139	..	346	210	+·009	**4**	348	276	+·001
226	330	−6	..	333	79	...	336	152	+·007	339	224	..	**5**	341	292	...
227	322	16	+·006	325	91	+·011	328	165	...	331	239	...	**6**	333	308	...
228	315	26	...	318	102		321	177	..	324	253	+·008	**7**	326	323	·000
229	307	36	+·005	310	113	.	313	190	+·006	316	268	..	**8**	318	339	...
230	299	45	...	302	125	+·010	305	203	..	308	282	...	**9**	310	355	.
231	291	55	..	294	136	...	297	216		300	297	...	November. **10**	302	371	−·001
232	283	65	+·004	286	147	.	289	229	+·005	292	311	...	**11**	294	386	..
233	275	75	...	278	159	+·009	281	242	...	284	326	...	**12**	286	402	
234	266	84	...	269	170	...	272	255	.	275	340	+·007	**13**	277	418	...
235	258	94	+·003	261	181	...	264	268	...	267	355	...	**14**	269	433	...
236	250	104	..	253	193	..	256	281	...	259	369	+·006	**15**	261	449	−·002
237	242	114	...	245	204	...	248	294	+·004	251	384	...	**16**	253	465	...
238	233	123	...	236	215	+·008	239	306	...	242	398	...	**17**	244	480	...
239	224	133	...	227	227	..	230	319	..	233	413	+·005	**18**	235	496	−·003
240	216	143	...	219	238		222	332	+·003	225	427	.	**19**	227	512	...
241	207	152	+·002	210	249	+·007	213	345	...	216	442	...	**20**	218	528	..
242	199	162	...	201	261	...	204	358	...	207	456	+·004	**21**	209	543	−·004
243	198	172	.	199	272	...	199	372	+·002	199	472	..	**22**	199	560	...
244	190	194	+·001	190	295	+·006	190	395	...	190	495	...	**23**	190	584	−·005
245	180	217	...	180	317	..	180	418	..	180	519	+·003	**24**	180	608	...
246	170	239	·000	170	340	..	170	440	+·001	170	542	...	**25**	170	632	...

TABLE III.—Sunrise from 8° to 12° N. latitude—*cont.*

Day of solar year.	Lat. 8°		Long +300″ = +·003 of day.	Lat. 9°		Long +852″ = +·010 of day.	Lat. 10°		Long. +564″ = +·007 of day.	Lat. 11°		Long. +816″ = +·009 of day.	Eng. date.	Lat. 12°		Long. +212″ = +·002 of day.
	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Trivandrum.**	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Rameswaram**	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Madura.**	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Tanjore.**		Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Maisur.**
			A.D. 1000—1400.			**A.D.** 1000—1400.			**A.D.** 1000—1400.			**A.D.** 1000—1400.				**A.D.** 1000—1400.
247	+160	−262	−·001	+160	−368	+·005	+160	−463	+ 001	+160	−565	+·002	**26**	+160	−656	−·006
248	150	285	..	150	385	...	150	486	·000	150	588	...	Nov. **27**	150	679	
249	140	307	...	140	408	+·004	140	509	..	140	612	..	**28**	140	703	−·007
250	180	330	.	180	431	.	130	532	..	130	635	+·001	**29**	130	727	
251	120	352	...	120	454	...	120	554	−·001	120	658	...	**30**	120	751	
252	110	375	−·002	110	476	+·003	110	577	...	110	682	·000	**1**	110	775	−·008
253	100	397	..	100	499	...	100	600	−·002	100	705	...	**2**	100	799	..
254	90	420	− 003	90	522	..	90	623	...	90	728	..	**3**	90	823	−·010
255	80	442		80	544	+·002	80	646	..	80	752	−·002	**4**	80	847	...
256	70	465	−·004	70	567	...	70	668	...	70	775	...	**5**	70	871	...
257	60	487	...	60	590	...	60	691	−·004	60	798	...	**6**	60	895	...
258	50	510	−·005	50	618	...	50	714	..	50	821	..	**7**	50	918	−·011
259	40	532	...	40	635	·000	40	737	.	40	845	−·003	**8**	40	942	...
260	80	555	.	30	658	.	30	760	...	30	868	...	**9**	30	966	...
261	20	577	...	20	681	...	20	782	−·005	20	891	..	**10**	20	990	...
262	10	600	−·006	10	708	...	10	805		10	915	.	**11**	10	1014	−·012
263	0	622	..	0	726	−·001	0	828		0	938	−·004	**12**	0	1038	...
264	−10	645	− 007	−10	749	.	−10	851	...	−10	961	...	**13**	−10	1062	...
265	20	667	...	20	772	...	20	874	...	20	985	...	**14**	20	1086	..
266	29	690	−·008	28	794	...	28	896	...	28	1008	...	**15**	28	1110	...
267	38	712	...	37	817	−·002	37	919	..	37	1031	−·006	December. **16**	37	1134	−·014
268	48	735	...	47	840	...	47	942	−·007	47	1054	...	**17**	47	1157	...
269	59	757	..	57	862		57	965	...	57	1078	...	**18**	57	1181	...
270	68	780	...	66	885	−·004	66	988	...	66	1101	.	**19**	66	1205	.
271	78	802	...	77	908	..	77	1010	...	77	1124	−·007	**20**	77	1229	−·015
272	88	825	...	87	931	...	87	1033	−·008	87	1148	.	**21**	87	1253	...
273	98	847	−·009	97	953		97	1056	...	97	1171	...	**22**	97	1277	...
274	104	870	...	104	976	...	104	1080	...	104	1196	...	**23**	104	1300	..
275	111	883	...	111	988	.	111	1092	...	111	1208	−·008	**24**	111	1311	−·016
276	119	895	..	118	1001	..	118	1105	...	118	1220	...	**25**	118	1323	...
277	126	908	...	126	1014	...	125	1117	−·010	125	1232	...	**26**	125	1334	...
278	134	921	−·010	133	1026	.	133	1130	...	132	1246	...	**27**	132	1345	...
279	141	934	..	140	1039	−·006	140	1142	...	139	1255	...	**28**	139	1356	...
280	149	946	−·011	148	1051	.	147	1154	...	146	1267	.	**29**	146	1368	−·017
281	156	959	...	155	1064	.	154	1167		154	1279	..	**30**	153	1379	...
282	164	972	−·012	162	1076	...	162	1179	...	161	1291	..	**31**	160	1390	...
283	171	985	...	170	1089	...	169	1192	...	168	1303	.	**1**	167	1402	...
284	179	997	..	177	1101	...	176	1204	...	175	1315	...	**2**	174	1413	−·019
285	186	1010	...	184	1114	...	183	1216	...	182	1329	−·010	**3**	181	1424	..
286	194	1023	...	192	1126	.	191	1229	...	189	1339	...	**4**	188	1436	...
287	201	1035	...	199	1139	...	198	1241		196	1351	...	**5**	195	1447	
288	209	1048	...	206	1151	...	205	1254	..	204	1363	...	**6**	202	1458	...
289	216	1061	..	214	1164	..	212	1266	..	211	1374	...	**7**	209	1469	...
290	224	1074		221	1176	−·008	220	1278	..	218	1386	...	**8**	216	1481	...
291	231	1086	...	228	1189	.	227	1291	...	225	1398	...	January. **9**	223	1492	...
292	239	1099	...	236	1202	...	234	1303	...	232	1410	...	**10**	230	1503	...
293	246	1112	...	243	1214	...	241	1316		239	1422	...	**11**	237	1515	...
294	254	1125		250	1227	.	249	1328	...	246	1434	...	**12**	244	1526	−·018
295	261	1137	...	258	1239	...	256	1340	−·012	254	1446	...	**13**	251	1537	...
296	269	1150		265	1252	...	263	1353	.	261	1458	..	**14**	258	1549	...
297	276	1163	..	272	1264	...	270	1365	...	268	1470	...	**15**	265	1560	...
298	284	1176		280	1277	..	278	1378	...	275	1482		**16**	273	1571	...
299	291	1188	...	287	1289	...	285	1390	...	282	1493	...	**17**	281	1582	...
300	299	1201	−·013	294	1302	...	292	1402	...	289	1505	...	**18**	288	1594	...
301	306	1214	...	302	1314	...	299	1415	...	296	1517	...	**19**	295	1605	...
302	314	1226	...	309	1327	...	306	1427	...	304	1529	...	**20**	303	1616	...
303	321	1239	...	316	1339	...	314	1440	...	311	1541	...	**21**	310	1628	.
304	325	1252	..	323	1352	...	321	1452	...	318	1552	...	**22**	317	1640	...
305	328	1241	...	326	1340	...	324	1438	...	321	1537	...	**23**	320	1623	...

TABLE III.—Sunrise from 8° to 12° N. latitude—*cont.*

Day of solar year.	Lat. 8° Eqn. of time in seconds.	Lat. 8° ⊙'s trop long. in seconds.	Long. +300" =+ ·003 of day. Total correctn. as fraction of a day. Trivandrum. A.D. 1000—1400	Lat. 9° Eqn. of time in seconds.	Lat. 9° ⊙'s trop. long. in seconds.	Long. +852" =+ ·010 of day. Total correctn. as fraction of a day. Rāmēswaram A.D. 1000—1400	Lat. 10° Eqn. of time in seconds.	Lat. 10° ⊙'s trop. long. in seconds	Long. +564" =+ ·007 of day. Total correctn. as fraction of a day. Madura. A.D. 1000—1400	Lat. 11° Eqn. of time in seconds.	Lat. 11° ⊙'s trop. long. in seconds.	Long. +816" = ·009 of day. Total correctn. as fraction of a day. Tanjore. A.D. 1000—1400	Eng. date.	Lat. 12° Eqn. of time in seconds.	Lat. 12° ⊙'s trop. long. in seconds.	Long. + 212" =+ ·002 of day. Total correctn. as fraction of a day. Maisur. A.D. 1000—1400
306	−332	−1231	−·018	−330	−1327	−·008	−327	−1424	...	−324	−1521	−·010	24	−323	−1607	−·018
307	335	1220	...	333	1315	...	331	1411	− 011	328	1506	...	25	327	1590	...
308	339	1209	...	334	1303	...	334	1397	...	331	1490	...	January. 26	330	1574	...
309	342	1198	...	340	1291	...	337	1888	...	334	1475	...	27	333	1557	...
310	346	1188	...	344	1278	...	341	1369	...	338	1460	...	28	337	1541	−·017
311	349	1177	...	347	1266	...	344	1355	...	341	1444	...	29	340	1524	...
312	353	1166	...	351	1254	...	347	1342	...	344	1429	...	30	343	1508	...
313	356	1156	...	354	1242	...	351	1328	...	348	1413	−·009	31	347	1491	...
314	360	1145	...	358	1229	.	354	1314	...	351	1398	...	1	350	1475	...
315	363	1134	...	361	1217	...	357	1800	...	354	1383	...	2	353	1458	...
316	367	1123	...	365	1205	−·007	361	1281	...	358	1367	...	3	357	1442	−·016
317	370	1113	...	368	1193	...	364	1273	...	361	1352	...	4	360	1455	...
318	374	1102	−·011	372	1180	...	367	1259	...	364	1336	...	5	363	1409	−·015
319	377	1091	...	375	1168	...	371	1245	...	368	1321	...	6	367	1392	...
320	381	1081	...	379	1156	...	374	1231	.	371	1306	−·008	7	370	1376	...
321	384	1070	...	382	1144	...	377	1217	−·010	374	1290	...	8	373	1359	...
322	388	1059	...	386	1131	−·006	381	1204	...	378	1275	...	9	377	1343	...
323	391	1048	...	389	1119	...	384	1190	...	381	1259	...	10	380	1326	...
324	395	1038	...	393	1107	...	387	1176	−·009	384	1244	...	11	383	1310	...
325	398	1027	...	396	1095	...	391	1162	...	388	1229	−·007	12	387	1293	...
326	402	1016	...	400	1082	...	394	1148	...	391	1213	...	February. 13	390	1277	−·014
327	405	1006	...	403	1070	...	397	1135	...	394	1198	...	14	393	1260	...
328	409	995	−·010	407	1058	−·005	401	1121	...	398	1182	−·006	15	397	1244	...
329	412	984	...	410	1045	...	404	1107	−·008	401	1167	...	16	400	1227	−·013
330	415	973	...	414	1033	...	407	1093	...	404	1152	−·005	17	403	1211	..
331	418	963	−·009	417	1021	−·004	411	1079	..	408	1136	.	18	406	1194	−·012
332	422	952	...	419	1009	...	414	1066	−·007	411	1121	...	19	408	1178	...
333	425	941	...	422	996	...	417	1052	...	414	1105	−·004	20	411	1161	...
334	429	931	−·008	425	984	−·003	421	1038	..	418	1090	...	21	414	1145	−·011
335	432	920	...	428	972	...	424	1024	−·006	420	1076	...	22	417	1128	...
336	432	889	...	428	940	−·002	424	990	...	420	1040	−·003	23	417	1090	−·010
337	433	859	−·007	429	907	...	425	956	...	421	1004	..	24	418	1053	..
338	433	828	...	429	875	...	425	922	− 005	421	968	−·002	25	418	1015	−·009
339	434	797	...	430	842	−·001	426	888	..	422	932	...	26	419	978	...
340	434	766	...	430	810	...	426	854	−·004	422	896	...	27	419	940	...
341	435	736	−·006	431	778	..	427	820	...	423	861	−·001	28	420	902	−·008
342	435	705	...	431	745	·000	427	785	...	423	825	.	1	420	865	...
343	436	675	−·005	432	713	...	428	751	−·003	424	789	·000	2	421	827	−·007
344	436	640	...	432	680	...	428	.717	...	424	753	..	3	421	790	...
345	437	613	...	433	648	+·002	429	683	−·002	425	717	+·001	4	422	752	−·006
346	437	583	−·004	433	616	...	429	649	...	425	681	...	5	422	714	...
347	438	552	...	434	583	...	430	615	...	426	645	...	6	423	677	...
348	438	521	...	434	551	...	430	581	−·001	426	609	+·002	7	423	639	−·005
349	439	491	−·003	435	518	..	431	547	...	427	573	...	8	424	602	...
350	439	460	..	435	486	+ 003	431	513	·000	427	537	+·003	9	424	564	−·004
351	440	429	−·002	436	454	...	432	479	...	428	502	.	March. 10	425	526	..
352	440	399	...	436	421	...	432	444	...	428	466	...	11	425	489	−·003
353	441	368	...	437	389	+·004	433	410	+·001	429	430	+ 004	12	426	451	...
354	441	337	−·001	437	356	...	433	376	...	429	394	...	13	426	414	...
355	442	307	...	438	324	...	434	342	...	430	358	+·005	14	427	376	−·002
356	442	276	...	438	292	+·005	434	308	...	430	322	..	15	427	338	...
357	443	245	·000	439	259	...	435	274	..	431	286	...	16	428	301	−·001
358	443	215	...	439	227	+·006	435	240	+·003	431	250	+·006	17	428	263	...
359	444	184	..	440	194	...	436	206	...	432	214	..	18	429	226	·000
360	444	153	+·001	440	162	...	436	172	...	432	178	+·007	19	429	188	...
361	445	123	...	441	130	+·008	437	138	+·004	433	143	...	20	430	150	...
362	445	92	...	441	97	...	437	103	..	433	107	...	21	430	113	...
363	446	61	...	442	65	...	438	69	+·005	434	71	+·008	22	431	75	...
364	446	31	..	442	32	+·009	438	35	...	434	36		23	431	38	+·001
365	447	0	...	443	0	...	439	0	...	435	0	+·009	24	432	0	...

TABLE III.—Sunrise from 13° to 17° N. latitude.

Day of solar year.	Lat. 13° Eqn of time in seconds.	Lat. 13° ☉'s trop. long. in seconds.	Long. +1072″ = +·012 of day. Total correctn. as fraction of a day. **Madras.** A.D. 1000—1400.	Lat. 14° Eqn. of time in seconds.	Lat. 14° ☉'s trop. long. in seconds.	Long. +1008″ = +·012 of day. Total correctn. as fraction of a day. **Nellore.** A.D. 1000—1400.	Lat. 15° Eqn of time in seconds.	Lat. 15° ☉'s trop. long. in seconds.	Long. +168″ = +·002 of day. Total correctn. as fraction of a day. **Vizianagram.** A.D. 1000—1400.	Lat. 16° Eqn. of time in seconds	Lat. 16° ☉'s trop long. in seconds.	Long. −800″ = −·008 of day. Total correctn. as fraction of a day. **Belgaum.** A.D. 1000—1400.	**Eng. date.**	Lat. 17° Eqn. of time in seconds.	Lat. 17° ☉'s trop. long. in seconds.	Long. +648″ = +·008 of day. Total correctn as fraction of a day. **Hyderabad.** A.D. 1000—1400.
1	−428	+39	+·012	−424	+41	+·012	−420	+43	+·008	−417	+45	−·003	25	−413	+46	+·008
2	426	78	.	422	82	.	418	86	..	415	89	−·002	26	411	93	+·009
3	424	118	+·013	420	123	+·013	416	129	+·004	413	133	−·001	March. 27	409	139	+·010
4	423	157	.	419	164	...	415	172	...	411	178	..	28	408	186	+·011
5	421	196	+·014	417	205	+·014	413	215	+·005	410	222	·000	29	406	232	...
6	419	235	...	415	246	...	411	258		407	267	...	30	404	278	+·012
7	417	274	+·015	413	287	+·015	409	301	+·006	406	311	+·001	31	402	325	...
8	414	314	...	410	328	..	407	344	...	403	351	...	1	399	371	...
9	412	351	+·016	406	369	+·016	404	387	...	401	395	+·002	2	397	418	.
10	409	388	...	405	410	...	402	430	...	398	440	...	3	395	464	+·013
11	407	428	+·018	403	451	...	399	473	+·007	396	484	+·003	4	392	510	...
12	404	467	...	400	492	+·017	396	516	...	393	529	...	5	389	557	+·015
13	401	506	...	397	533	...	394	559	...	391	573	...	6	387	603	...
14	398	545	...	394	574	...	391	602	..	387	618	+·004	7	384	650	...
15	395	584	...	391	615	+·019	388	645	+·009	384	662	...	8	381	696	+·016
16	392	624	+·020	388	656	...	384	688	...	381	707	...	9	378	743	...
17	388	663	...	385	697	...	381	731	..	378	751	.	10	374	790	+·018
18	385	702	...	381	738	...	378	774	+·011	375	796	+·006	11	371	836	+·019
19	382	741	...	378	779	+·021	374	817	+·012	371	840	...	12	368	883	...
20	377	780	+·022	374	820	...	370	860	...	367	885	...	13	364	929	...
21	374	820	..	370	861	...	367	903	...	364	929	+·008	14	360	973	..
22	370	859	...	366	902	..	363	946	+·014	360	974	...	April. 15	358	1019	+·020
23	368	898	...	364	943	+·022	361	989	...	358	1018	.	16	356	1066	...
24	366	937	+·023	362	984	...	359	1032	...	356	1063	...	17	354	1113	...
25	364	976	...	360	1025	...	357	1075	..	354	1107	+·009	18	352	1159	+·021
26	362	1016	...	358	1066	...	355	1118	+·015	352	1152	...	19	350	1206	...
27	360	1055	...	356	1107	+·024	353	1161	...	350	1196	..	20	348	1252	...
28	358	1094	...	354	1148	...	351	1204	...	349	1241	+·010	21	347	1298	+·023
29	356	1123	...	352	1189	...	349	1247	...	348	1285	...	22	346	1345	...
30	354	1176	...	350	1232	...	347	1290	+·016	347	1336	...	23	345	1392	...
31	352	1194	...	348	1251	+·025	346	1313	...	346	1358	...	24	344	1416	..
32	350	1212	+·024	347	1271	...	345	1334	..	345	1381	+·011	25	343	1439	+·024
33	348	1230	...	346	1290	..	344	1354	...	344	1403	...	26	342	1463	...
34	347	1248	...	345	1309	..	343	1375	+·017	340	1425	...	27	338	1487	..
35	341	1266	...	339	1328	+·026	337	1396	...	335	1447	+·013	28	332	1510	...
36	335	1285	+·025	333	1348	...	331	1417	..	329	1470	...	29	326	1531	...
37	329	1303	...	327	1367	...	325	1438	+·018	323	1492	...	30	321	1558	...
38	324	1321	...	322	1386	...	320	1458	..	317	1514	+·014	1	315	1582	+·025
39	317	1339	...	316	1406	+·027	313	1479	...	311	1537	...	2	309	1605	...
40	311	1357	+·027	309	1425	...	307	1500	+·019	305	1559	...	3	303	1629	...
41	305	1375	...	303	1444	...	301	1521	...	299	1581	...	4	297	1653	+·026
42	298	1393	...	296	1464	...	294	1542	...	292	1604	...	5	290	1676	...
43	292	1411	...	290	1483	...	288	1562	...	286	1626	+·015	6	284	1700	...
44	285	1429	...	283	1502	...	282	1583	...	280	1648	...	7	278	1724	...
45	278	1447	...	277	1521	..	275	1604	...	273	1670	...	8	271	1747	...
46	272	1466	...	270	1541	...	268	1625	...	267	1693	...	9	265	1771	+·028
47	265	1484	...	263	1560	...	261	1646	...	259	1715	...	10	258	1795	...
48	258	1502	+·029	256	1579	...	254	1666	...	253	1737	...	11	251	1819	...
49	251	1520	...	249	1599	...	248	1687	...	246	1760	...	May. 12	244	1842	...
50	244	1538	...	242	1618	+·028	241	1708	...	239	1782	...	13	237	1866	...
51	237	1556	...	235	1637	...	234	1729	...	232	1804	...	14	230	1890	+·030
52	229	1574	+·030	228	1657	...	226	1750	..	225	1827	...	15	223	1913	...
53	222	1592	...	220	1676	...	219	1770	+·021	217	1849	...	16	216	1937	...
54	214	1610	...	213	1695	...	212	1791	...	210	1871	...	17	209	1961	...
55	207	1628	...	206	1714	...	204	1812	...	203	1893	...	18	201	1984	...
56	200	1647	...	198	1734	...	197	1833	...	196	1916	...	19	194	2008	...
57	192	1665	...	190	1753	...	189	1854	...	188	1938	...	20	186	2032	...
58	188	1683	...	186	1772	. .	184	1874	...	183	1960	...	21	182	2056	...
59	184	1701	...	182	1792	...	180	1895	...	179	1983	...	22	178	2079	...
60	180	1719	...	178	1811	...	176	1916	...	175	2005	..	23	174	2103	...
61	176	1736	...	174	1832	...	172	1936	...	171	2028	...	24	171	2128	...
62	172	1725	...	170	1822	+·029	168	1926	...	167	2019	...	25	167	2120	...

TABLE III.—Sunrise from 13° to 17° N. latitude—*cont.*

	Lat. 13°		Long. +1072″ = +·012 of day.	Lat. 14°		Long. +1008″ = +·012 of day.	Lat. 15°		Long. +168″ = +·002 of day	Lat. 16°		Long. —800″ = —·003 of day.		Lat. 17°		Long. +648″ = +·008 of day.
Day of solar year.	Eqn. of time in seconds.	⊙'s trop. long. in seconds.	Total correctn. as faction of a day. **Madras.** A.D. 1000—1400.	Eqn. of time in seconds.	⊙'s trop. long. in seconds.	Total correctn. as fraction of a day. **Nellore.** A.D. 1000—1400	Eqn of time in seconds.	⊙'s trop. long. in seconds.	Total correctn. as fraction of a day. **Vizianagram** A.D. 1000—1400.	Eqn. of time in seconds.	⊙'s trop. long. in seconds	Total correctn. as fraction of a day. **Belgaum.** A.D. 1000—1400.	Eng. date.	Eqn of time in seconds	⊙'s trop long. in seconds.	Total correctn as fraction of a day, **Hyderabad.** A.D. 1000—1400.
63	−164	+1714	+·029	−164	+1812	+·029	−164	+1917	+·021	−163	+2010	+·017	May 26	−168	+2111	+·029
64	155	1704	...	155	1802	..	155	1907	...	154	2001	...	27	154	2108	...
65	146	1693	...	146	1792	...	146	1898	...	145	1992	...	28	145	2094	...
66	137	1682	...	137	1781	..	137	1888	...	136	1983	...	29	136	2086	...
67	128	1671	...	128	1771	...	127	1878	...	126	1975	...	30	127	2078	.
68	119	1660	...	119	1761	...	118	1869	...	118	1966	...	31	118	2069	...
69	109	1650		109	1751	...	109	1859	...	109	1957	...	June 1	108	2060	...
70	100	1639	...	100	1741	...	100	1850	...	99	1948	...	2	99	2052	...
71	91	1628	...	91	1781	...	90	1840	...	90	1939	.	3	90	2044	...
72	81	1617	...	81	1721	...	81	1830	...	81	1930	...	4	80	2036	...
73	72	1606	...	72	1711	...	71	1821	...	71	1921	...	5	71	2027	...
74	62	1596	...	62	1701	...	62	1811	...	62	1912	...	6	62	2019	...
75	54	1585	...	54	1691	...	54	1802	...	54	1903	...	7	54	2010	
76	43	1574	...	43	1680	...	43	1792	...	43	1894	...	8	43	2002	...
77	34	1563	...	33	1670	...	33	1782	...	33	1886	...	9	33	1994	...
78	24	1552	+·028	24	1660	...	24	1773	...	24	1877	+·016	10	24	1985	...
79	15	1542	...	15	1650	...	15	1763	...	15	1868	...	11	15	1977	...
80	5	1531	...	5	1640	...	5	1754	..	5	1859	...	12	5	1968	+·028
81	+ 4	1520	...	+ 4	1630	...	+ 4	1744	...	+ 4	1850	...	13	+ 4	1960	..
82	14	1509	...	14	1620	...	14	1734	...	14	1841	...	14	14	1952	...
83	23	1498	...	23	1610	...	23	1725	...	23	1832	...	15	23	1943	...
84	33	1488	...	33	1600	...	33	1715	...	33	1823	...	16	33	1935	...
85	43	1477	...	43	1590	...	42	1706	+·020	42	1814	...	17	42	1926	...
86	52	1466	...	52	1579	...	52	1696	...	52	1805	...	18	51	1918	...
87	61	1455	...	61	1569	+·028	61	1686	...	61	1797	...	19	61	1910	...
88	71	1444	...	71	1559	...	71	1677	.	71	1788	...	20	70	1901	...
89	80	1434	...	80	1549	...	80	1667	...	80	1779		21	80	1893	...
90	90	1423	+·027	89	1539	...	89	1658	+·019	89	1770	+·015	22	89	1884	+·027
91	105	1412	...	105	1528	...	105	1648	...	105	1760	...	23	106	1876	...
92	115	1388	...	115	1503	...	115	1622	...	111	1734	...	24	116	1849	...
93	124	1363	...	125	1478	+·027	125	1597	...	125	1708	...	25	126	1823	...
94	134	1339	...	134	1453	...	135	1571	...	135	1681	...	26	135	1796	...
95	144	1314	...	144	1428	...	144	1546	...	145	1655	+·014	27	145	1769	+·026
96	154	1290	+·026	154	1403	..	154	1520	+·018	155	1629	...	28	155	1742	...
97	163	1266	...	164	1378	...	164	1495	.	164	1603	...	29	165	1716	...
98	173	1241	...	173	1353	..	174	1469	...	174	1577	...	30	174	1689	...
99	183	1217	...	183	1328	+·026	183	1444	...	184	1550	. .	July 1	184	1662	...
100	192	1192	...	192	1303	...	193	1418	...	193	1524	+·018	2	193	1636	+·025
101	201	1168	...	202	1278	...	202	1393	...	202	1498	...	3	203	1609	...
102	210	1144	+·025	211	1253	...	211	1367	+·017	212	1472	. .	4	212	1582	...
103	220	1119	...	220	1228	...	221	1342	...	221	1446	...	5	222	1556	...
104	229	1095	...	230	1203	...	230	1316	...	231	1419	...	6	231	1539	...
105	238	1070	..	239	1178	+·024	239	1291	...	240	1393	...	7	240	1502	...
106	247	1046	...	248	1153	...	248	1265	...	249	1367	+·011	8	249	1475	+·024
107	256	1022	...	257	1128	...	257	1240	...	258	1341	...	9	258	1449	...
108	266	997	...	266	1103	...	266	1214	...	267	1315	...	10	267	1422	...
109	274	973	...	274	1078	...	275	1189	+·016	276	1288	...	11	276	1395	..
110	283	948	...	283	1053	...	284	1163	...	285	1262	...	12	285	1369	...
111	291	924	...	292	1028	..	292	1138	...	293	1236	..	13	294	1342	...
112	300	900	+·023	300	1003	...	301	1112	...	301	1210	+·010	14	302	1316	+·022
113	308	875	...	309	978	...	309	1087	...	310	1184	...	15	311	1289	...
114	317	857	...	318	953	+·023	318	1061	...	319	1157	...	16	320	1262	...
115	325	826	...	326	928	...	326	1036	...	327	1131	...	17	328	1235	...
116	333	802	...	334	903	...	334	1010	+·015	335	1105	...	18	336	1208	...
117	341	778	...	342	878	...	342	985	..	343	1079	...	19	344	1182	...
118	349	753	...	350	853	...	351	959	...	352	1053	...	20	352	1155	+·021
119	356	729	...	355	828	...	356	934	..	358	1026	...	21	358	1128	...
120	360	704	...	360	803	...	361	908	...	363	1000	..	22	364	1102	...
121	364	680	+·022	365	778	+·022	366	883	...	369	974	.	23	370	1075	...
122	368	656	...	370	752	...	372	856	+·013	375	948	..	24	377	1048	...
123	375	639	...	377	733	...	379	835	...	382	926	...	25	384	1025	...
124	382	621	...	385	715	...	387	815	...	389	905	+·008	26	391	1002	...
125	389	604	...	391	696	...	394	795	...	396	883	...	27	398	978	...

TABLE III.—Sunrise from 13° to 17° N. latitude—*cont.*

Day of solar year.	Lat. 13° Eqn. of time in seconds.	Lat. 13° ☉'s trop. long. in seconds.	Long. +1072″ =+·012 of day. Total correctn. as fraction of a day. **Madras.** A.D. 1000—1400.	Lat. 14° Eqn. of time in seconds.	Lat. 14° ☉'s trop. long. in seconds.	Long. +1008″ =+·012 of day. Total correctn. as fraction of a day. **Nellore.** A.D. 1000—1400.	Lat. 15° Eqn. of time in seconds.	Lat. 15° ☉'s trop long. in seconds.	Long. +168″ =+·002 of day. Total correctn. as fraction of a day. **Vizianagram.** A.D. 1000—1400.	Lat. 16° Eqn of time in seconds.	Lat. 16° ☉'s trop. long. in seconds.	Long. −300″ =−·003 of day. Total correctn. as fraction of a day. **Belgaum.** A.D. 1000—1400.	Eng. Date.	Lat. 17° Eqn. of time in seconds.	Lat. 17° ☉'s trop. long. in seconds.	Long. +648″ =+·008 of day. Total correctn. as fraction of a day. **Hyderabad.** A.D. 1000—1400.
126	+896	+587	+·022	+898	+677	+·022	+401	+775	+·018	+408	+861	+·008	July. **28**	+405	+955	+·021
127	403	569	...	405	658	...	408	754	...	410	839	...	**29**	412	932	...
128	409	552	...	412	640	...	414	784	...	416	818	...	**30**	419	909	+·020
129	416	535	+·021	418	621	+·021	421	714	+·012	423	796	...	**31**	425	886	...
130	422	518	...	425	602	..	427	694	...	430	774	+·007	**1**	432	862	...
131	428	500	...	431	584	...	433	673	...	436	753	...	**2**	438	839	...
132	484	488	...	487	565	...	439	658	...	442	731	...	**3**	444	816	...
133	440	466	...	443	546	...	446	683	...	448	709	...	**4**	451	793	...
134	446	448	...	449	528	...	451	612	...	454	688	...	**5**	457	770	...
135	452	481	...	454	509	...	457	592	...	460	666	...	**6**	462	746	...
136	457	414	...	460	490	...	463	572	...	465	644	...	**7**	468	728	+·018
137	462	896	...	465	471	...	468	551	...	471	622	...	**8**	474	700	...
138	468	379	...	471	453	...	474	531	...	476	601	...	**9**	479	677	...
139	473	362	...	476	434	...	479	511	...	482	579	...	**10**	485	654	...
140	478	845	...	481	415	+·020	484	491	...	487	557	...	**11**	489	630	...
141	483	827	...	486	397	...	489	470	...	492	586	...	**12**	494	607	..
142	488	810	...	491	378	...	494	450	...	496	514	...	**13**	499	584	...
143	492	298	...	495	359	...	498	430	...	501	492	...	**14**	504	561	...
144	497	275	...	500	341	...	503	409	...	506	471	+·005	**15**	509	538	...
145	501	258	...	504	322	...	507	389	+·010	510	449	...	**16**	514	518	...
146	505	241	...	508	803	...	511	369	...	514	427	...	August. **17**	517	491	...
147	509	223	...	512	284	...	516	348	...	518	405	...	**18**	521	468	...
148	513	206	...	517	266	...	520	328	...	523	384	...	**19**	526	445	...
149	517	189	...	520	247	...	523	308	...	526	362	...	**20**	529	422	+·017
150	520	172	+·019	524	228	...	527	288	...	530	840	...	**21**	533	398	...
151	523	154	...	527	210	...	530	267	...	533	319	...	**22**	536	375	...
152	501	136	...	505	192	+·019	508	248		512	296	...	**23**	516	352	...
153	504	132	...	508	186	...	512	240	...	515	286	...	**24**	519	341	...
154	507	127	...	511	180	...	515	232	...	518	277	...	**25**	522	329	...
155	510	123	...	514	173	...	518	224	...	527	267	...	**26**	525	318	...
156	512	118	...	516	167	...	520	216	...	523	258	+·004	**27**	527	307	...
157	514	114	...	518	161	...	522	208	...	525	248	...	**28**	529	295	+·016
158	517	110		521	155	...	525	200	+·009	528	239	...	**29**	532	284	...
159	519	105	...	523	149	...	527	192	...	530	229	...	**30**	534	273	...
160	521	101	...	525	142	...	529	184	...	532	220	...	**31**	536	262	...
161	523	96	...	527	136	...	531	176	...	534	210	...	**1**	538	250	...
162	524	92	...	528	130	...	532	168	...	535	201	...	**2**	539	239	...
163	525	88	+·018	529	124	...	533	160	...	537	191	...	**3**	541	228	...
164	527	83	..	531	118	...	535	152	...	538	182	...	**4**	543	216	...
165	528	79	...	532	111	...	536	144	...	539	172	...	**5**	543	205	...
166	528	74	...	532	105	...	536	136	...	540	163	+·002	**6**	544	194	+·015
167	529	70	...	533	99	...	536	128	...	541	153	...	**7**	545	182	...
168	530	66	...	534	93	+·017	538	120	...	542	144	...	**8**	546	171	...
169	531	61	...	535	87	...	539	112	...	542	134	...	**9**	547	160	...
170	531	57	...	535	80	...	539	104	...	543	125	...	September. **10**	547	149	...
171	531	52	...	536	74	...	540	96	+·008	543	115	...	**11**	547	137	...
172	531	48	...	536	68	...	540	88	...	543	106	...	**12**	547	126	...
173	531	44	...	536	62	...	540	80	...	543	96	...	**13**	547	115	+·014
174	531	39	...	535	56	...	539	72	...	543	87	...	**14**	547	103	...
175	531	35	...	535	49	...	539	64	...	542	77	...	**15**	547	92	...
176	531	30	...	535	43	...	539	56	...	542	68	...	**16**	546	81	...
177	530	26	...	534	37	...	538	48	...	541	58	...	**17**	545	69	...
178	529	22	...	533	31	...	537	40	...	540	49	...	**18**	544	58	...
179	528	17	...	532	25	...	536	32	...	539	39	...	**19**	543	47	...
180	527	13	...	531	18	...	535	24	...	538	30	...	**20**	543	36	+·013
181	525	8	...	529	12	...	533	16	+·007	536	20	...	**21**	541	24	...
182	524	4	+·017	528	8	...	532	8	...	535	11	...	**22**	540	18	...
183	522	0	...	526	0	...	530	0	...	534	0	+·001	**23**	538	0	...
184	521	−4	...	525	−6	...	529	−8	...	533	−10	...	**24**	537	−12	...
185	519	9	...	523	13	...	527	17	...	531	20	...	**25**	535	23	..
186	517	13	...	521	19	...	525	25	...	529	30	...	**26**	533	35	...

TABLE III.—Sunrise from 13° to 17° N. latitude—*cont.*

	Lat. 13°		Long. +1072″ = +·012 of day.	Lat. 14°		Long. +1008″ = +·012 of day.	Lat. 15°		Long. +168″ = +·002 of day.	Lat. 16°		Long. −300″ = −·003 of day.		Lat. 17°		Long. +648″. = +·008 of day.
Day of solar year.	Eqn. of time in seconds.	☉'s trop. long. in seconds	Total correctn. as fraction of a day. **Madras.** A.D. 1000–1400	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Nellore.** A.D. 1000–1400	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Vizianagaram.** A.D. 1000–1400	Eqn. of time in seconds.	☉'s trop. long in seconds.	Total correctn. as fraction of a day. **Belgaum.** A.D. 1000–1400	**Eng. date.**	Eqn. of time in seconds	☉'s trop long. in seconds.	Total correctn. as fraction of a day. **Hyderabad.** A.D. 1000–1400
187	+515	−18	+·017	+519	−26	+·017	+523	−38	+·007	+527	−40	+·001	**27**	+531	−47	+ 012
188	513	22	...	517	32	..	521	41	...	525	49		Sep. **28**	529	58	...
189	510	27	...	514	38	...	518	50	+·006	522	59	...	**29**	526	70	. .
190	507	31	...	511	45	...	515	58	...	519	69	·000	**30**	523	82	...
191	504	36	...	508	51	+·016	512	66	...	516	79		**1**	520	94	...
192	501	40	...	505	58	..	509	75	...	513	89	...	**2**	517	105	...
193	498	45	...	502	64	...	506	83	...	510	99	...	**3**	514	117	+·011
194	495	49	...	499	70	...	503	91	..	507	109	...	**4**	511	129	...
195	492	54	...	496	77	.	500	99	+·005	504	119	−·001	**5**	508	140	...
196	488	58	...	492	83	+·015	496	108	...	500	129	...	**6**	504	1 52	+·009
197	484	63	...	488	90	...	492	116	...	496	139	...	**7**	500	164	...
198	480	67	+·016	484	96	...	488	124	...	492	148	...	**8**	496	175	...
199	476	72	...	480	102	...	484	133	...	488	158	...	**9**	492	187	...
200	472	76	...	476	109	...	479	141	...	483	168	...	**10**	487	199	...
201	468	81	...	472	115	...	475	149	...	479	178	...	**11**	483	211	...
202	464	85	...	468	122	...	471	158	...	475	188	−·002	**12**	479	222	...
203	459	90	..	463	128	...	466	166	...	470	198	...	**13**	474	234	+·008
204	454	94	...	458	134	+·014	461	174	...	465	208	...	October **14**	469	246	...
205	450	99	...	454	141	...	456	183	...	460	218	...	**15**	464	257	...
206	445	103	+·015	449	147	..	451	191	+ 008	455	228	..	**16**	459	269	...
207	441	108	...	445	154	...	447	199	...	451	238	...	**17**	455	281	...
208	436	112	...	440	160	+·013	442	207	...	446	247	...	**18**	450	292	...
209	430	117	...	434	166	...	436	216	+·002	440	257	−·003	**19**	444	304	+·007
210	425	121	+·014	429	173	...	431	224	...	433	267	...	**20**	439	316	...
211	417	126	...	423	179	+·012	425	232	...	429	277	..	**21**	433	328	...
212	411	130	...	417	186	...	419	241	...	423	287	−·005	**22**	427	339	+·006
213	428	136	...	431	192	...	433	248	...	436	296	..	**23**	438	352	...
214	422	153	...	425	211	...	427	268	...	430	318	..	**24**	432	375	...
215	415	171	+ 013	418	229	...	420	289	...	423	339	−·006	**25**	425	398	+·005
216	408	188	...	411	248	+·011	413	309	+·001	416	361	.	**26**	418	422	...
217	401	205	...	404	267	...	406	329	...	409	383		**27**	411	445	...
218	394	222	+·012	397	285	...	399	349	..	402	404	−·007	**28**	404	468	+·004
219	387	240	...	390	304	+·010	392	370	·000	395	426	...	**29**	397	491	...
220	380	257	...	383	323	...	385	390	...	388	448	...	**30**	390	514	...
221	373	274	...	376	342	...	378	410	..	381	470	..	**31**	383	538	+·003
222	366	292	+·011	369	360	+·009	371	431	...	374	491		**1**	376	561	...
223	359	309	..	362	379	...	364	451	−·002	367	513	..	**2**	369	584	...
224	352	326	...	354	398	...	356	471	...	359	535	−·008	**3**	361	607	+·002
225	345	344	+·010	346	416	...	348	492	...	351	556	...	**4**	353	630	...
226	338	361	...	338	435	...	340	512	...	343	578	...	**5**	345	654	+·001
227	330	378	+·009	330	454	...	332	532	...	335	600	−·010	**6**	337	677	...
228	323	395	...	322	472	+·007	324	552	−·003	327	621	...	**7**	329	700	...
229	315	413	...	314	491	...	316	573	...	319	643	...	**8**	321	723	·000
230	307	430	...	306	510	..	307	593	...	310	665	...	**9**	312	746	...
231	299	447	...	298	529	...	299	613	−·005	302	687	...	**10**	304	770	−·001
232	291	465	...	290	547	...	291	634	...	294	708	−·011	November **11**	296	793	...
233	283	482	+·008	282	566	+·006	283	654	..	286	730	...	**12**	288	816	...
234	274	499	...	273	585	...	274	674	...	277	752	−·012	**13**	279	839	− 002
235	266	517	+·007	265	603	...	265	695	...	268	773	...	**14**	270	862	...
236	258	534	...	257	622	+·005	256	715	− 006	259	795	...	**15**	261	886	−·003
237	250	551	...	249	641	..	247	735	...	250	817	−·013	**16**	252	909	...
238	241	568	+·006	240	659	+·004	238	755	−·007	241	838	. .	**17**	243	932	.
239	232	586	...	231	678	...	229	776	...	232	860	−·014	**18**	234	955	−·004
240	224	603	...	223	699	...	220	796	...	223	882	...	**19**	225	978	
241	215	620	+·005	214	716	+·003	211	816	−·008	213	904	...	**20**	215	1002	− 005
242	206	638	...	205	734	...	202	837	...	204	925	−·015	**21**	206	1025	...
243	200	656	+·004	200	752	+·002	201	856	−·009	201	948	...	**22**	202	1048	...
244	191	680	...	191	777	...	192	881	...	192	974	−·016	**23**	193	1075	−·006
245	181	705	...	181	802	...	182	907	...	182	1000	...	**24**	183	1101	.
246	171	729	+ 003	171	827	+·001	172	932	−·010	172	1027	...	**25**	173	1128	−·007

TABLE III.—Sunrise from 13° to 17° N. latitude—cont.

Day of solar year.	Lat. 13° Eqn. of time in seconds.	Lat. 13° ☉'s trop. long. in seconds.	Long. +1072″ =+ ·012 of day. Total correctn. as fraction of a day **Madras.** A.D. 1000–1400	Lat. 14° Eqn. of time in seconds.	Lat. 14° ☉'s trop long in seconds	Long. +1008″ =+ ·012 of day. Total correctn. as fraction of a day. **Nellore.** A.D. 1000–1400	Lat. 15° Eqn. of time in seconds.	Lat. 15° ☉'s trop. long. in seconds.	Long. +168″ =+ ·002 of day. Total correctn. as fraction of a day. **Vizianagaram** A.D. 1000–1400	Lat. 16° Eqn. of time in seconds.	Lat. 16° ☉'s trop. long. in seconds.	Long. −300″ =− ·008 of day Total correctn. as fraction of a day. **Belgaum.** A.D. 1000–1400	**Eng. date.**	Lat. 17° Eqn. of time in seconds.	Lat. 17° ☉'s trop. long in seconds.	Long. +648″ =+ ·008 of day. Total correctn. as fraction of a day **Hyderabad.** A.D. 1000–1400
247	+161	−754	+·003	+161	−852	+·001	+162	−958	−·010	+162	−1053	−·017	November **26**	+163	−1155	−·007
248	151	778	...	151	877	·000	152	983	−·011	152	1079	.	**27**	153	1181	−·008
249	141	802	+·002	141	902	...	142	1009	...	142	1105	−·018	**28**	143	1208	...
250	131	827	...	131	927		132	1034	...	132	1131	...	**29**	133	1235	..
251	121	851	+·001	121	952	−·001	122	1060	−·012	122	1158	−·019	**30**	123	1262	−·009
252	111	876	...	111	977	.	112	1085	..	112	1184	...	**1**	113	1288	...
253	101	900	..	101	1002	−·002	102	1111	−·013	102	1210		**2**	103	1315	−·011
254	91	924	·000	91	1027	..	92	1136	...	92	1236	−·021	**3**	93	1342	...
255	81	949	...	81	1052	..	82	1162		82	1262		**4**	83	1368	...
256	71	973	...	71	1077	.	72	1187	−·014	72	1289	...	**5**	73	1395	−·012
257	61	998	−·002	61	1102	−·004	62	1213	.	62	1315	...	**6**	63	1422	..
258	51	1022	...	51	1127	..	52	1238	...	52	1341	−·022	**7**	53	1448	...
259	41	1046	...	41	1152	...	42	1264	..	42	1367	..	**8**	43	1475	...
260	31	1071		31	1177	..	32	1289	..	32	1393	...	**9**	33	1502	...
261	21	1095	−·003	21	1202	−·005	22	1315	−·016	22	1420	.	**10**	28	1529	−·013
262	11	1120	...	11	1227	...	12	1340	...	12	1446	−·024	**11**	13	1555	...
263	2	1144	..	2	1252	..	2	1366	...	2	1472	..	**12**	2	1582	...
264	−10	1168		−10	1277	.	−10	1391	.	−10	1498		**13**	−10	1609	
265	20	1193	−·005	20	1302	−·006	20	1417	−·017	20	1524	.	**14**	20	1635	−·015
266	29	1217	...	29	1327	...	30	1442	...	30	1551	...	**15**	31	1662	...
267	38	1242	...	38	1352	...	39	1468	...	39	1577	−·025	December **16**	40	1689	..
268	48	1266	...	48	1377	...	49	1493	..	49	1603	..	**17**	50	1715	...
269	58	1290	...	58	1402	...	59	1519		59	1629	...	**18**	60	1742	...
270	67	1315	.	67	1427	−·008	68	1544	−·019	68	1655	...	**19**	69	1769	.
271	78	1339	...	78	1452	.	79	1570	...	79	1682	...	**20**	80	1796	...
272	88	1364	...	88	1477	..	89	1595	...	89	1708	−·026	**21**	90	1822	...
273	98	1388	...	98	1502	...	99	1621	...	99	1734	...	**22**	100	1849	...
274	103	1412	−·007	103	1528	−·009	103	1648	−·020	103	1760	...	**23**	102	1876	...
275	110	1423	..	110	1538	...	109	1658	...	110	1769	...	**24**	109	1884	−·017
276	117	1434	...	117	1548	...	116	1667	.	117	1778	...	**25**	116	1893	...
277	124	1444	...	124	1558	...	122	1677	.	124	1787	−·027	**26**	123	1901	...
278	131	1455	.	131	1568	..	129	1686	...	131	1796	...	**27**	130	1910	...
279	138	1466	−·008	139	1578	−·010	135	1696	...	138	1801		**28**	137	1918	...
280	145	1477	..	146	1589	..	142	1706	−·021	145	1813	.	**29**	144	1926	...
281	152	1488		153	1599	...	148	1715		152	1822	...	**30**	151	1935	−·018
282	159	1498	...	160	1609	...	155	1725	...	159	1831	−·028	**31**	158	1943	...
283	166	1509	.	167	1619	...	161	1734	...	166	1840	...	**1**	165	1952	...
284	173	1520	−·009	175	1629	−·011	168	1744	...	173	1849	...	**2**	172	1960	...
285	180	1531	...	182	1639	.	174	1754	...	180	1858	..	**3**	179	1968	...
286	187	1542	...	189	1649	.	181	1763	...	187	1867	.	**4**	186	1977	...
287	194	1552	...	196	1659	...	187	1773	...	194	1876	..	**5**	193	1985	...
288	201	1563	.	203	1669		194	1782	...	201	1885	...	**6**	200	1994	−·019
289	208	1574	...	211	1679	...	200	1792		208	1893	.	**7**	207	2002	...
290	215	1585	...	218	1690	...	207	1802	−·022	215	1902	..	**8**	214	2010	...
291	222	1596	.	225	1700	...	213	1811	...	222	1911	..	**9**	221	2019	...
292	229	1606	...	232	1710	−·012	220	1821	.	229	1920	...	**10**	228	2027	..
293	236	1617	...	239	1720	...	227	1830	...	236	1929	−·029	**11**	235	2036	−·020
294	243	1628	−·010	247	1730	...	235	1840	...	243	1938	...	**12**	242	2044	...
295	250	1639	...	254	1740		242	1850	...	249	1947	...	**13**	248	2052	...
296	257	1650	...	261	1750	...	249	1859	−·023	256	1956	...	January **14**	255	2061	...
297	264	1660	...	268	1760	...	257	1869	...	262	1965	..	**15**	261	2069	...
298	271	1671	...	275	1770	...	264	1878	...	269	1974	−·028	**16**	268	2078	−·019
299	278	1682	...	283	1780	..	272	1888	...	276	1982	...	**17**	274	2086	...
300	285	1693	..	290	1791	...	279	1898	...	282	1991	.	**18**	280	2094	...
301	292	1704	−·009	297	1801	...	287	1907	...	289	2000	...	**19**	286	2103	...
302	299	1714	...	304	1811	...	294	1917	...	295	2009	...	**20**	293	2111	...
303	307	1725	...	311	1821	...	302	1926	−·021	302	2018	...	**21**	300	2120	−·018
304	315	1736	...	319	1832	...	310	1936	...	308	2028	...	**22**	306	2128	...
305	318	1718	...	322	1813	...	313	1915	...	311	2006	..	**23**	309	2104	...

TABLE III.—Sunrise from 13° to 17° N. latitude—*cont.*

Day of solar year.	Lat. 13° Eqn. of time in seconds.	Lat. 13° ☉'s trop. long. in seconds.	Long. + 1072″ = + ·012 of day. Total correctn as fraction of a day. **Madras.** A.D. 1000—1400	Lat. 14° Eqn. of time in seconds.	Lat. 14° ☉'s trop. long. in seconds.	Long. + 1008″ = + ·012 of day. Total correctn as fraction of a day. **Nellore.** A.D. 1000—1400	Lat. 15° Eqn. of time in seconds	Lat. 15° ☉'s trop long in seconds.	Long. +168″ = + ·002 of day Total correctn. as fraction of a day. **Vizianagaram.** A.D. 1000—1400	Lat. 16° Eqn of time in seconds.	Lat. 16° ☉'s trop. long. in seconds.	Long. −300″ = − ·003 of day. Total correctn. as fraction of a day. **Belgaum.** A.D. 1000 1400	**Eng. date.**	Lat. 17° Eqn. of time in seconds.	Lat. 17° ☉'s trop long in seconds	Long. + 648″ = + ·008 of day. Total correctn as fraction of a day. **Hyderabad.** A.D. 1000—1400
306	−321	−1700	−·009	−325	−1793	−·010	−316	−1894	−·021	−314	−1983	−·027	**24**	−312	−2081	−·018
307	324	1682	...	328	1774	...	319	1874	...	317	1961		**25**	315	2057	−·017
308	327	1664	−·008	331	1755	...	322	1853	...	320	1939	...	January **26**	318	2033	...
309	330	1645	...	334	1735	..	325	1832	...	323	1916	..	**27**	321	2009	...
310	333	1627	..	337	1716		328	1811	..	326	1894	...	**28**	324	1986	.
311	336	1609	...	340	1697	−·009	331	1790	.	329	1872	.	**29**	327	1962	..
312	339	1591	..	343	1678	..	334	1770	...	332	1850	.	**30**	330	1938	−·016
313	342	1573	.	346	1658	...	337	1749	−·019	334	1827	−·026	**31**	333	1915	..
314	345	1555	...	349	1639	...	340	1728	...	337	1805	..	**1**	336	1891	..
315	348	1537	..	352	1620	..	343	1707	...	340	1783	.	**2**	339	1867	...
316	351	1519	..	355	1600	...	346	1686	...	343	1760	−·025	**3**	342	1844	−·015
317	354	1501	−·007	358	1581	...	349	1666	..	346	1738	...	**4**	345	1820	..
318	357	1483	..	361	1562	−·008	352	1645	...	349	1716	−·024	**5**	348	1796	...
319	360	1464	...	364	1542	...	355	1624	−·018	352	1693		**6**	351	1772	..
320	363	1446	−·006	367	1523	−·007	358	1603		355	1671	−·023	**7**	354	1749	−·014
321	366	1428	..	370	1504	..	361	1582	.	358	1649		**8**	357	1725	
322	369	1410	..	373	1485	..	364	1562	...	361	1627	..	**9**	360	1701	...
323	372	1392	..	376	1465	...	367	1541	−·017	364	1604	.	**10**	364	1678	...
324	375	1374	−·004	380	1446	...	370	1520	..	367	1582	.	**11**	367	1654	−·013
325	378	1356	...	383	1427		373	1499	−·016	370	1560	...	**12**	370	1630	...
326	381	1338	...	386	1407	...	376	1478	...	373	1537	..	**13**	374	1607	−·012
327	384	1320	...	389	1388	−·005	379	1458	..	376	1515	−·022	February **14**	377	1583	...
328	387	1302	.	392	1369	...	382	1437		379	1493	..	**15**	380	1559	−·011
329	390	1283	..	395	1349	...	385	1416	...	382	1470	−·021	**16**	383	1535	..
330	393	1265	..	398	1330	...	388	1395	−·015	385	1448		**17**	386	1512	−·010
331	396	1247	−·003	401	1311	.	391	1374	...	388	1426	−·020	**18**	389	1488	..
332	400	1229	...	404	1292	−·004	394	1354	−·014	391	1404	...	**19**	392	1464	−·009
333	404	1211	−·002	406	1272		398	1333	...	395	1381	−·019	**20**	395	1441	..
334	408	1193	−·001	408	1253	−·003	402	1312	−·013	399	1359	...	**21**	397	1417	−·008
335	413	1176	...	410	1232	...	406	1292	..	402	1336	−·018	**22**	399	1392	..
336	413	1137	...	411	1191	−·002	407	1249	−·012	403	1291	...	**23**	400	1346	−·007
337	414	1098	+·000	411	1150	..	407	1206	..	403	1247	−·017	**24**	400	1299	...
338	414	1058	..	412	1109	...	408	1163	−·011	404	1202	.	**25**	401	1253	..
339	415	1019	+·001	412	1068	−·001	408	1120	..	404	1158	−·016	**26**	401	1206	−·006
340	415	980	.	413	1027		409	1077	−·010	405	1113	..	**27**	402	1160	..
341	416	941	+·002	413	986	·000	409	1034		405	1069	−·015	**28**	402	1114	−·005
342	416	902	..	414	945	.	410	991	−·009	406	1024		**1**	403	1067	..
343	417	862	..	414	904	+·001	410	948	..	406	980	−·014	**2**	403	1021	−·004
344	417	823	...	415	863	..	411	905	−·008	407	935		**3**	404	974	
345	418	784	...	416	822	+·002	411	862	...	407	891	−·013	**4**	404	928	−·002
346	418	745	+·004	416	781	.	412	819	−·006	408	846	...	**5**	405	882	..
347	419	706	..	417	740	+·003	412	776	...	408	802	−·012	**6**	405	835	−·001
348	419	666	+·005	417	699	..	413	733	−·005	409	757	...	**7**	406	789	
349	420	627	...	418	658	.	413	690	...	409	713	−·011	**8**	406	742	·000
350	420	588	...	418	617	+·004	414	647	...	410	668		**9**	407	696	...
351	421	549	..	419	576	...	414	604	...	410	624	−·010	**10**	407	650	+·001
352	421	510	...	419	535	+·005	415	561	−·004	411	579		**11**	408	603	..
353	422	470	+·006	420	494	...	416	518	...	411	535	−·009	March **12**	408	557	+·002
354	422	431	...	420	453	+·006	416	475	−·003	412	490	...	**13**	409	510	...
355	423	392	+·007	421	412	...	417	432	...	413	446	−·008	**14**	409	464	..
356	423	353	.	422	371	+·007	418	389	−·002	413	401		**15**	410	418	+·004
357	424	314	+·008	422	330	..	418	346	...	414	357	−·007	**16**	410	371	.
358	424	274	...	423	289	+·008	419	303	−·001	414	312	...	**17**	411	325	+·005
359	425	235	+·009	424	248		419	260	...	415	268	−·006	**18**	412	278	...
360	426	196	...	424	207	+·009	420	217	·000	416	223		**19**	413	232	+·006
361	427	157	+·010	425	166	...	421	174	..	417	179	−·005	**20**	414	186	..
362	428	118		426	125	+·010	422	131	+·001	418	134	...	**21**	415	139	+·007
363	429	79	..	427	84	...	423	88	..	419	89	−·004	**22**	416	92	...
364	430	40	+·011	428	41	+·011	424	43	..	420	49	...	**23**	417	46	+·008
365	432	0	...	429	0	...	425	0	+·002	421	10	−·003	**24**	418	00	...

TABLE III.—Sunrise from 18° to 22° N. latitude—*cont.*

Day of solar year.	Lat. 18° Eqn. of time in seconds.	Lat. 18° ☉'s trop. long. in seconds.	Long. − 428″ = − ·005 of day. Total correctn. as fraction of a day. **Satara.** A.D. 1000—1400.	Lat. 19° Eqn. of time in seconds.	Lat. 19° ☉'s trop. long. in seconds.	Long. − 460″ = − ·005 of day. Total correctn. as fraction of a day. **Poona.** A.D. 1000 1400.	Lat. 20° Eqn. of time in seconds.	Lat. 20° ☉'s trop. long. in seconds.	Long − 476″ = − ·0055 of day. Total correctn. as fraction of a day. **Nasik.** A.D. 1000—1400.	Lat. 21° Eqn. of time in seconds.	Lat. 21° ☉'s trop. long. in seconds.	Long. + 800″ = + ·009 of day. Total correctn. as fraction of a day. **Nagpur.** A.D. 1000—1400.		**Eng. date.**	Lat. 22° Eqn. of time in seconds.	Lat. 22° ☉'s trop. long. in seconds.	Long. − 616″ = − ·007 of day. Total correctn. as fraction of a day. **Baroda.** A.D. 1000—1400.
1	−409	+48	−·004	−405	+50	−·003	−401	+52	−·003	−397	+54	+·011		**25**	−393	+56	−·005
2	407	96	−·003	403	100	..	399	104	.	395	107	+·012		**26**	391	111	−·004
3	405	144	...	401	150	−·002	398	156	−·002	393	161			**27**	389	167	−·003
4	404	193	−·002	400	200	...	396	208	−·001	392	215	+·013	March.	**28**	388	223	...
5	402	241	−·001	398	250	−·001	394	259	..	390	269	+·014		**29**	386	278	−·002
6	400	289	...	396	300	·000	392	311	000	388	323	..		**30**	384	334	−·001
7	398	338	·000	394	350	.	390	363	...	386	377	+·015		**31**	382	390	...
8	396	386	..	392	400	+·001	388	425	.	384	431	+·016		**1**	380	445	·000
9	393	434	+·001	390	450	...	386	477	+·001	382	485	...		**2**	378	501	+·001
10	391	483	...	387	500	+·002	383	529	+·002	379	539	+·017		**3**	375	557	+·002
11	388	531	+·002	385	550	...	381	580	...	377	592	...		**4**	373	612	...
12	386	579	+·003	382	600	+·003	378	632	+·003	374	646	+·018		**5**	371	668	+·003
13	383	627	...	380	650	+·004	376	684	+·004	372	700	+·019		**6**	368	724	+·004
14	380	676	+·004	377	700	...	373	736	...	369	754	..		**7**	365	779	...
15	377	724	...	374	750	+·005	370	788	+·005	366	808	+ 020		**8**	362	835	+·005
16	374	772	+·005	371	800	...	367	840	+·006	363	862	+·021		**9**	359	891	...
17	371	821	...	367	850	...	364	892	...	360	916	...		**10**	356	946	+·006
18	367	869	+·006	364	900	+·006	361	944	+·007	357	970	+ 022		**11**	353	1002	+·007
19	364	917	...	361	950	+·007	357	996	...	353	1024	...		**12**	350	1058	+·008
20	360	966	+·007	357	1000	+·008	354	1048	+·008	350	1078	+·023		**13**	346	1114	...
21	357	1014	...	354	1050	...	350	1099	+·009	346	1131	+·024		**14**	343	1169	..
22	353	1062	+·008	350	1100	...	346	1152	...	343	1185	...		**15**	339	1225	+·009
23	349	1110	. .	346	1150	+·009	342	1204	+·010	339	1239	+·025		**16**	335	1281	...
24	346	1159	+·009	342	1200	...	339	1256	...	335	1298	...		**17**	332	1336	...
25	341	1207	...	338	1250	+·010	335	1307	...	331	1347	...		**18**	328	1392	+·010
26	337	1255	...	334	1300	..	331	1359	...	327	1401	+·026	April.	**19**	324	1448	...
27	333	1304	+·010	330	1350	..	327	1411	...	323	1455	...		**20**	320	1503	+·011
28	329	1352	...	326	1400	+·011	323	1463	+·011	319	1509	..		**21**	316	1559	..
29	324	1400	+·011	322	1450	...	318	1515	...	315	1563	...		**22**	312	1615	..
30	357	1448	...	354	1500	...	352	1556	...	349	1616	+·027		**23**	346	1672	+·012
31	352	1473	...	349	1527	+·012	347	1584	+·012	344	1646	...		**24**	342	1703	...
32	346	1498	...	344	1553	...	342	1612	...	339	1675	+·028		**25**	336	1734	...
33	341	1524	+·012	339	1580	...	336	1640	...	334	1705	...		**26**	331	1766	+ 013
34	336	1549	...	333	1607	..	331	1668	+·013	328	1735	.		**27**	326	1797	...
35	330	1574		328	1634	+·013	325	1696	...	323	1764	+·029		**28**	320	1828	.
36	324	1599	+·013	322	1660	...	320	1725	..	317	1794	...		**29**	315	1859	+·014
37	319	1624	. .	316	1687	...	314	1753	+·014	312	1824	...		**30**	309	1890	...
38	313	1650	...	311	1714	+·014	309	1781	...	306	1854	+·030		**1**	304	1922	+·015
39	307	1675	+·014	305	1740	...	303	1809	. .	300	1883	...		**2**	298	1953	...
40	301	1700	...	299	1767	+·015	296	1837	+·015	294	1913	+·031		**3**	292	1984	+·016
41	295	1725	...	293	1794	..	291	1865	+·016	288	1943	...		**4**	286	2015	...
42	288	1750	+·015	286	1820	...	284	1893	...	282	1972	+·032		**5**	280	2046	+·017
43	282	1776	...	280	1847	+·016	278	1921	...	276	2002	.		**6**	274	2078	...
44	276	1801	...	274	1874	...	272	1949	+·017	270	2032	+·033		**7**	268	2109	...
45	270	1826	...	267	1900	.	265	1977	...	263	2061	...		**8**	261	2140	+·018
46	263	1851	+·016	261	1927	+·017	259	2006	+·018	257	2091	...		**9**	255	2171	...
47	256	1876	+·017	254	1954	...	252	2034	...	250	2121	+·034		**10**	248	2202	+·019
48	249	1902	...	247	1981	...	246	2062	...	244	2151	. .		**11**	242	2234	...
49	243	1927	...	241	2007	+·018	239	2090	+·019	237	2180	..	May	**12**	236	2265	+·020
50	236	1952	...	234	2084	...	232	2118	...	230	2210	+·035		**13**	229	2296	...
51	229	1977	...	227	2061	...	226	2146		224	2240	...		**14**	222	2327	...
52	222	2002	.	220	2087	...	219	2174	...	217	2269	...		**15**	215	2358	+·021
53	214	2028	+ 018	213	2114	...	211	2202	+·020	210	2299	...		**16**	208	2390	...
54	207	2053	...	206	2141	+·019	204	2230	...	203	2329	...		**17**	201	2421	...
55	200	2078	...	199	2167	...	197	2258	...	196	2358	...		**18**	194	2452	...
56	193	2103	...	192	2194	...	190	2287	...	189	2388	...		**19**	187	2483	...
57	185	2128	...	184	2221	...	183	2315	...	181	2418	...		**20**	180	2514	...
58	178	2154	...	177	2248	...	175	2343	...	174	2448	...		**21**	173	2546	...
59	170	2179	...	169	2274	...	168	2371	...	167	2477	...		**22**	165	2577	...
60	163	2204	...	162	2301	...	161	2399	...	159	2507	...		**23**	158	2608	...
61	180	2228	...	179	2328	...	179	2428	...	179	2536	...		**24**	178	2640	...
62	171	2220	...	171	2321	...	170	2422	...	170	2530	...		**25**	169	2635	...

TABLE III.—Sunrise from 18° to 22° N. latitude—*cont.*

Day of solar year.	Lat. 18° Eqn. of time in seconds.	Lat. 18° ☉'s trop. long. in seconds.	Long. − 428″ = − ·005 of day. Total correctn. as fraction of a day. **Satara.** **A.D.** 1000–1400.	Lat. 19° Eqn. of time in seconds.	Lat. 19° ☉'s trop. long. in seconds.	Long. − 460″ = − ·005 of day. Total correctn. as fraction of a day. **Poona.** **A.D.** 1000–1400.	Lat. 20° Eqn. of time in seconds.	Lat. 20° ☉'s trop. long. in seconds.	Long. − 476″ = − ·0055 of day. Total correctn. as fraction of a day. **Nasik.** **A.D.** 1000–1400.	Lat. 21° Eqn. of time in seconds.	Lat. 21° ☉'s trop. long. in section.	Long. + 800″ = + ·009 of day. Total correctn. as fraction of a day. **Nagpur.** **A.D.** 1000–1400.	**Eng. date.**	Lat. 22° Eqn. of time in seconds.	Lat. 22° ☉'s trop long. in seconds.	Long. − 616″ = − ·007 of day. Total correctn. as fraction of a day. **Baroda.** **A.D.** 1000–1400.
63	−162	+2213	+ ·018	−162	+2384	+ ·019	−162	+2415	+ ·020	−161	+2524	+ ·035	**26** May.	−161	+2630	+ ·021
64	153	2205	...	153	2306	..	153	2409	...	152	2518	...	**27**	152	2624	...
65	145	2198	...	144	2300	...	144	2402	...	144	2512	..	**28**	143	2619	...
66	135	2190	...	135	2292	..	135	2396	..	135	2500	...	**29**	134	2614	...
67	126	2182	...	126	2285	...	126	2390	...	126	2501	...	**30**	125	2609	...
68	117	2175	...	117	2278	...	117	2383	..	117	2495	...	**31**	116	2604	...
69	108	2167	...	108	2271	..	107	2377	...	107	2489	...	**1** June.	107	2598	...
70	99	2160	...	99	2264	...	98	2370	...	98	2483	...	**2**	98	2593	...
71	90	2152	...	89	2257	...	89	2364	...	89	2477	+ ·036	**3**	89	2588	...
72	80	2144	. .	80	2250	...	80	2358	...	80	2471	...	**4**	79	2583	...
73	71	2137	...	71	2243	..	71	2351	...	70	2465	...	**5**	70	2578	...
74	62	2129	...	61	2236	...	61	2345	...	61	2459	...	**6**	61	2572	...
75	53	2122	...	53	2227	...	53	2338	...	53	2453	...	**7**	53	2567	...
76	43	2114	...	42	2221	...	42	2332	...	42	2447	...	**8**	42	2562	...
77	33	2106	...	33	2214	...	33	2326	. .	33	2442	...	**9**	33	2557	...
78	24	2099	...	24	2207	...	24	2319	...	24	2436	...	**10**	24	2552	...
79	15	2091	...	15	2200	...	15	2313	...	15	2430	...	**11**	15	2546	...
80	5	2084	...	5	2193	...	5	2306	+ ·021	5	2424	...	**12**	5	2541	+ ·022
81	+4	2076	...	+4	2186	...	+4	2300	...	+4	2418	...	**13**	+4	2536	...
82	14	2068	...	13	2179	...	13	2294	...	13	2412	...	**14**	13	2531	...
83	23	2061	+ ·017	23	2172	...	23	2287	...	23	2406	...	**15**	23	2526	...
84	33	2053	...	32	2165	+ ·018	32	2281	+ ·020	32	2400	...	**16**	32	2520	+ ·021
85	42	2046	...	42	2158	...	42	2274	...	42	2394	...	**17**	42	2515	...
86	51	2038	...	51	2150	...	51	2268	...	51	2388	+ ·035	**18**	51	2510	...
87	60	2030	...	60	2143	+ ·017	60	2262	+ ·019	60	2383	...	**19**	60	2505	...
88	70	2023	+ ·016	70	2136	...	70	2255	...	69	2377	...	**20**	69	2500	+ ·020
89	79	2015	...	79	2129	...	79	2249	...	79	2371	+ ·034	**21**	79	2494	...
90	88	2008	...	88	2122	+ ·016	88	2242	+ ·018	88	2365	...	**22**	88	2489	+ ·019
91	106	2000	...	106	2116	...	106	2236	...	107	2360	...	**23**	107	2484	...
92	116	1972	...	116	2088	...	117	2207	+ ·017	117	2331	...	**24**	117	2454	...
93	126	1945	+ ·015	126	2060	...	126	2179	...	127	2302	...	**25**	127	2424	...
94	136	1917	...	136	2033	...	136	2150	...	137	2272	...	**26**	137	2395	...
95	146	1890	...	146	2004	...	146	2122	...	146	2243	+ ·033	**27**	147	2365	...
96	155	1862	...	156	1976	...	156	2093	. .	156	2214	...	**28**	157	2335	+ ·018
97	165	1835	...	166	1948	...	166	2064	...	166	2185	...	**29**	167	2305	...
98	175	1807	...	175	1920	...	176	2036	...	176	2156	...	**30**	177	2275	...
99	185	1780	+ ·014	185	1892	...	186	2007	...	186	2126	..	**1** July.	187	2246	...
100	194	1752	...	194	1864	...	195	1979	+ ·016	195	2097	+ ·032	**2**	196	2216	...
101	203	1725	...	204	1836	+ ·015	204	1950	...	205	2068	...	**3**	205	2186	...
102	213	1697	...	263	1808	...	214	1921	...	214	2039	...	**4**	215	2156	+ ·017
103	222	1670	...	223	1780	...	223	1893	+ ·015	224	2010	+ ·031	**5**	224	2126	...
104	232	1642	...	232	1752	...	233	1864	...	233	1980	...	**6**	234	2097	...
105	241	1615	+ ·013	242	1724	...	242	1836	...	243	1951	+ ·030	**7**	243	2067	...
106	250	1587	...	251	1696	...	251	1807	...	252	1922	...	**8**	253	2037	+ ·016
107	259	1560	...	260	1668	+ ·014	260	1778	...	261	1893	...	**9**	261	2007	...
108	268	1532	+ ·012	269	1640	...	269	1750	...	270	1864	...	**10**	271	1977	...
109	277	1505	...	278	1620	...	278	1721	...	279	1834	...	**11**	280	1948	+ ·015
110	286	1477	...	287	1584	+ ·013	287	1693	...	288	1805	...	**12**	289	1918	...
111	294	1450	...	295	1556	...	296	1664	+ ·014	296	1776	...	**13**	297	1888	...
112	303	1422	...	304	1528	...	305	1635	...	305	1747	...	**14**	306	1858	...
113	312	1395	...	312	1500	...	313	1607	...	314	1718	+ ·029	**15**	315	1828	+ ·014
114	321	1367	...	321	1472	...	322	1578	...	323	1688	...	**16**	324	1799	...
115	329	1340	+ ·011	329	1444	+ ·012	330	1550	...	331	1659	...	**17**	332	1769	...
116	337	1312	...	338	1416	...	339	1521	+ ·013	339	1630	+ ·028	**18**	340	1739	+ ·013
117	345	1285	...	346	1388	...	346	1492	...	347	1601	...	**19**	348	1709	...
118	353	1257	...	354	1360	...	354	1464	+ ·012	356	1572	...	**20**	357	1679	...
119	361	1230	...	362	1332	...	362	1435	...	363	1542	...	**21**	364	1650	...
120	369	1202	+ ·010	369	1304	+ ·011	370	1407	...	371	1513	...	**22**	372	1620	...
121	371	1175	...	378	1276	...	375	1378	...	377	1484	+ ·027	**23**	379	1590	...
122	379	1148	...	381	1248	...	383	1348	...	385	1456	...	**24**	387	1560	+ ·012
123	386	1123	...	388	1222	...	390	1320	+ ·011	393	1427	+ ·026	**25**	395	1529	...
124	394	1099	...	396	1195	...	398	1293		401	1397	...	**26**	403	1498	...
125	400	1073	+ ·009	403	1169	+ ·010	405	1265	+ ·010	407	1368	...	**27**	410	1467	+ ·011

TABLE III.—Sunrise from 18° to 22° N. latitude—*cont.*

Day of solar year.	Lat. 18° Eqn. of time in seconds	Lat. 18° ☉'s trop. long in seconds.	Long. −428″ =−·005 of day. Total correctn as fraction of a day. **Satara.** A.D. 1000–1400.	Lat. 19° Eqn. of time in seconds.	Lat. 19° ☉'s trop. long. in seconds	Long. −460″ =−·005 of day. Total correctn as fraction of a day **Poona.** A.D. 1000–1400.	Lat. 20° Eqn. of time in seconds.	Lat. 20° ☉'s trop. long. in seconds	Long −476″ =−·0055 of day. Total correctn. as fraction of a day. **Nasik** A.D. 1000–1400.	Lat. 21° Eqn. of time in seconds.	Lat. 21° ☉'s trop. long. in seconds.	Long. + 800″ =+·009 of day. Total correctn. as fraction of a day. **Nagpur.** A.D. 1000–1400.	**Eng. date.**	Lat 22° Eqn. of time in seconds.	Lat 22° ☉'s trop. long. in seconds	Long − 616″ =−·007 of day. Total correctn. as fraction of a day **Baroda.** A.D. 1000–1400.
126	+408	+1049	+·009	+410	+1143	+·010	+412	+1237	+·010	+415	+1339	+·025	July **28**	+417	+1436	+·011
127	415	1024	...	417	1116	...	419	1209	+·009	422	1309	...	**29**	424	1405	+·010
128	421	1000	...	424	1090	+·009	426	1182	..	429	1280	...	**30**	431	1375	...
129	428	975	...	430	1064	...	433	1154	...	435	1251	...	**31**	438	1344	...
130	435	950	+·008	437	1038	...	440	1126	.	442	1222	...	**1**	445	1313	...
131	441	926	...	443	1011	...	446	1099	+·008	447	1193	...	**2**	451	1282	...
132	447	901	...	450	985	...	452	1071	...	455	1162	+·024	**3**	457	1251	+·009
133	453	876	...	456	959	+·008	459	1043	...	461	1134	...	**4**	464	1220	...
134	459	852	...	462	932	...	464	1016	...	467	1104	...	**5**	470	1189	...
135	465	827	...	468	906	...	470	988	...	473	1075	...	**6**	476	1158	...
136	471	802	+·007	474	880	...	476	960	...	479	1046	...	**7**	482	1127	+·008
137	476	777	...	479	853	...	482	932	..	485	1016	+·023	**8**	487	1096	...
138	483	753	...	485	827	+·007	487	905	...	490	987	...	**9**	493	1066	...
139	487	728	+·006	490	801	...	493	877	+·007	496	958	...	**10**	499	1035	+·007
140	492	703	...	495	775	...	498	849	...	501	929	+·022	**11**	504	1004	...
141	497	679	...	500	748	+·006	503	822	...	506	899	...	**12**	509	973	+·006
142	502	654	...	505	722	...	508	794	+·006	511	870	...	**13**	514	942	...
143	507	629	+·005	510	696	...	513	766	...	516	841	+·021	**14**	519	911	...
144	511	605	...	514	669	...	517	739	...	520	811	...	**15**	523	880	...
145	516	580	...	519	643	..	522	711	...	525	782	...	**16**	528	849	...
146	520	555	...	523	617	...	526	683	...	529	753	...	August **17**	532	818	...
147	524	530	...	527	590	...	530	655	...	534	723	...	**18**	536	787	...
148	529	506	...	532	564	...	535	628	...	538	694	...	**19**	540	757	+·005
149	532	481	...	536	538	...	539	600	...	542	665	...	**20**	544	726	...
150	536	456		539	512	+·005	542	572	+·005	545	636	+·020	**21**	548	695	...
151	539	432	...	542	485	...	545	545	..	548	606	...	**22**	552	664	...
152	519	408	...	523	460	..	527	516	...	551	576	...	**23**	535	632	+·004
153	522	395	...	526	445	...	530	499	...	554	557	...	**24**	538	612	...
154	526	382	+·004	520	430	...	533	483	...	537	539	...	**25**	541	591	...
155	529	368	...	532	416	...	536	466	+·004	540	520	+·019	**26**	544	571	...
156	531	355	...	534	401	+·004	538	450	...	542	502	...	**27**	546	550	+·003
157	533	342	...	536	386	...	540	433	...	544	483	...	**28**	548	530	...
158	536	329	...	538	371	...	542	416	...	546	464	...	**29**	550	510	...
159	538	316	...	540	356	...	544	400	...	548	446	...	**30**	552	489	...
160	540	302	+·003	542	342	...	546	383	+·003	550	427	...	**31**	554	469	+·002
161	542	289	...	544	327	+·003	548	367	...	552	409	+·018	**1**	556	448	...
162	543	276	...	546	312	...	549	350	...	553	390	...	**2**	557	428	...
163	545	263	...	547	297	...	551	333	...	555	371	...	**3**	559	408	...
164	547	250	...	548	282	...	553	317	...	557	353	...	**4**	561	387	...
165	548	236	...	550	268	...	554	300	...	558	334	...	**5**	562	367	...
166	548	223	+·002	551	253	...	554	284	...	558	316	+·017	**6**	562	346	...
167	549	210	...	552	238	+·002	555	267	...	559	297	...	**7**	563	326	+·001
168	550	197	...	553	223	...	556	250	...	560	278	...	**8**	564	306	...
169	551	184	...	554	208	...	557	234	...	561	260	...	**9**	565	285	...
170	551	170	...	554	194	...	557	217	+·002	561	241	...	**10**	565	265	...
171	551	157	...	554	179	...	557	201	...	561	223	+·016	September **11**	565	244	·000
172	552	144	...	554	164	...	557	184	...	561	204	..	**12**	565	224	...
173	551	131	+·001	554	149	+·001	557	167	+·001	561	185	...	**13**	565	204	...
174	551	118	...	554	134	...	557	151	...	561	167	...	**14**	565	183	...
175	551	104	...	554	120	...	557	131	...	561	148	+·015	**15**	565	163	−·001
176	550	91	...	554	105	...	557	118	...	561	130	...	**16**	565	142	...
177	549	78	...	553	90	...	557	101	...	560	111	...	**17**	564	122	...
178	548	65	...	552	75	...	555	84	·000	559	92	...	**18**	563	102	..
179	548	52	...	551	60	·000	554	68	..	558	74	...	**19**	562	81	−·002
180	547	38	...	550	46	...	553	51	...	557	55	+·014	**20**	561	61	...
181	545	25	...	548	31	...	551	35	...	555	37	...	**21**	559	40	...
182	544	12	·000	547	16	...	550	18	...	554	18	...	**22**	558	20	...
183	542	0	...	545	0	...	549	0	−·001	554	0	...	**23**	558	0	−·003
184	541	−14	...	544	−15	−·001	547	−17	...	552	−19	+·013	**24**	556	−21	...
185	539	27	...	542	31	...	545	34	...	550	38	...	**25**	554	42	...
186	537	41	...	540	46	...	543	52	...	548	58	...	**26**	552	63	...

TABLE III.—Sunrise from 18° to 22° N. latitude—cont.

Day of solar year.	Lat. 18° Eqn. of time in seconds.	Lat. 18° ⊙'s trop. long. in seconds.	Long. −428″ = −·005 of day. Total correctn. as fraction of a day. Satara. A.D. 1000–1400.	Lat. 19° Eqn. of time in seconds.	Lat. 19° ⊙'s trop. long. in seconds.	Long. −460″ = −·005 of day. Total correctn as fraction of a day Poona. A.D. 1000–1400.	Lat. 20° Eqn. of time in seconds.	Lat. 20° ⊙'s trop. long. in seconds.	Long. −476″ =− 0055 of day. Total correctn. as fraction of a day. Nasik A.D. 1000–1400.	Lat. 21° Eqn. of time in seconds.	Lat. 21° ⊙'s trop long in seconds.	Long. +800″ =+·009 of day. Total correctn. as fraction of a day. Nagpur. A.D. 1000–1400.	Eng. date.	Lat. 22° Eqn of time in seconds.	Lat. 22° ⊙'s trop. long. in seconds.	Long −616″ = −·007 of day. Total correctn. as fraction of a day Baroda A.D. 1000–1400.
187	+535	−54	·000	+538	−61	−·001	+541	−69	−·001	+546	−77	+·013	27	+550	−84	−·004
188	533	68	...	536	76	...	539	86	−·002	544	96	...	Sep. 28	548	105	...
189	530	82	−·001	533	92	...	536	103	...	541	115	+·012	29	545	127	...
190	527	95	...	530	107	−·002	538	120	...	538	134	...	30	542	148	..
191	524	109	...	527	122	...	530	138	...	535	154	...	1	539	169	−·005
192	521	122	−·002	524	138	...	527	155	. .	532	173	...	2	536	190	...
193	518	136	...	521	153	...	524	172	−·003	529	192	+·011	3	533	211	...
194	515	150	...	518	168	...	521	189	...	526	211	...	4	530	232	...
195	512	163	...	515	184	−·003	518	206	...	523	230	...	5	527	253	−·006
196	508	177	...	511	199	...	514	224	...	519	250	+·010	6	523	274	...
197	504	190	...	507	214	...	510	241	...	515	269	...	7	519	295	...
198	500	204	...	503	229	...	506	258	−·004	511	288	...	8	515	316	−·007
199	496	218	...	499	245	...	502	275	...	507	307	...	9	511	338	...
200	491	231	...	494	260	...	497	292	...	502	326	+·009	10	506	359	
201	487	245	−·003	490	275	−·004	493	310	...	498	346	...	11	502	380	...
202	483	258	...	486	291	...	489	327	...	494	365	...	12	498	401	−·008
203	478	272	...	481	306	..	484	344	−·005	490	384	. .	13	493	422	...
204	473	286	−·004	476	321	−·005	479	361	...	484	403	+·008	14	488	443	...
205	468	299	..	471	337	...	474	378	−·006	479	422	...	15	483	464	−·009
206	463	313	−·005	466	352	...	469	396	−·007	474	442	...	16	478	485	...
207	459	326	−·006	462	367	−·006	465	413	...	470	461	+·007	17	474	506	−·010
208	454	340	...	457	382	...	460	430	...	465	480	+·006	October. 18	469	527	...
209	448	354	...	451	398	...	454	447	−·008	459	499	...	19	463	549	−·011
210	443	367	...	446	413	−·007	449	464	...	454	518	...	20	458	570	...
211	437	381	...	440	428	...	443	482	...	448	538	+·005	21	452	591	...
212	431	394	−·007	434	444	−·008	437	499	.	442	557	+·004	22	446	612	−·012
213	441	408	...	443	460	...	446	516	...	449	576	...	23	451	632	−·013
214	435	433	−·008	437	486	...	440	544	−·009	443	605	...	24	445	663	...
215	428	457	...	430	513	−·009	433	571	...	436	635	. .	5	438	694	...
216	421	482	...	423	539	...	426	599	−·010	429	664	+ 003	26	431	725	−·014
217	414	507	...	416	565	...	419	627	−·011	422	693	...	27	424	756	...
218	407	531	−·009	409	591	−·010	412	654	...	415	722	...	28	417	786	...
219	400	556	...	402	618	...	405	682	−·012	408	752	+·002	29	409	817	−·015
220	393	581	. .	395	644	...	398	710	...	401	781	...	30	402	848	...
221	386	606	−·010	388	670	...	391	738	...	394	810	...	31	394	879	−·016
222	379	630	...	381	697	−·011	384	765	−·013	387	840	+·001	1	386	910	...
223	372	655	−·011	374	723	−·012	377	793	...	380	869	·000	2	378	941	−·017
224	364	680	...	366	749	...	369	821	...	372	898	...	3	370	972	...
225	356	704	...	358	776	−·013	361	848	−·014	364	928	...	4	362	1003	...
226	348	729	−·012	350	802	...	353	876	...	356	957	−·001	5	354	1034	−·018
227	340	754	...	342	828	...	345	904	...	348	986	...	6	345	1065	−·019
228	332	778	− 013	334	854	−·014	337	931	−·015	340	1015	−·002	7	337	1095	...
229	324	803	...	326	881	...	329	959	...	332	1045	...	8	329	1126	...
230	315	828	...	317	907	−·015	320	987	..	323	1074	...	9	320	1157	−·020
231	307	853	...	309	933	...	312	1015	−·016	315	1103	− 003	10	311	1188	...
232	299	877	−·014	301	960	. .	304	1042	...	307	1133	...	11	303	1219	−·021
233	291	902	...	293	986	−·016	296	1070	−·017	298	1162	−·004	12	294	1250	...
234	282	927	−·015	284	1012	...	287	1098	−·018	290	1191		November. 13	284	1280	−·022
235	273	951	...	275	1039	....	278	1125	...	281	1221	−·005	14	275	1312	...
236	264	976	...	266	1065	−·017	269	1153	−·019	272	1250	...	15	266	1343	−·023
237	255	1001	−·016	257	1091	...	260	1181	..	263	1279	.	16	257	1374	...
238	246	1025	−·017	248	1117	− 018	251	1208	...	254	1308	−·006	17	248	1404	...
239	237	1050	...	239	1144	...	242	1236	−·020	245	1338	...	18	238	1435	−·024
240	228	1075	...	230	1170	...	233	1264	...	236	1367	−·007	19	229	1466	−·025
241	218	1100	−·018	220	1196	−·019	223	1292	−·021	226	1396	−·008	20	219	1497	...
242	209	1124	. .	211	1223	−·020	214	1319	...	217	1426	...	21	210	1528	...
243	202	1148	−·019	203	1248	...	203	1348	−·022	203	1456		22	204	1560	−·026
244	193	1175	...	194	1276		194	1377	...	194	1485	−·009	23	195	1590	...
245	183	1203	...	184	1304	−·021	184	1405	−·023	184	1514	...	24	185	1620	−·027
246	173	1230	−·020	174	1332	...	174	1434	...	174	1544	−·010	25	175	1649	...

TABLE III.—Sunrise from 18° to 22° N. latitude—*cont.*

	Lat. 18°		Long. −428″ = −·005 of day.	Lat. 19°		Long. −460″ = −·005 of day.	Lat. 20°		Long −476″ = −·0055 of day.	Lat. 21°		Long. +800″ = +·009 of day.		Lat. 22°		Long. −·616″ = −·007 of day.
Day of solar year.	Eqn. of time in seconds	☉'s trop. long. in seconds	Total correctn. as fraction of a day. **Satara.**	Eqn. of time in seconds.	☉'s trop. long in seconds	Total correctn. as fraction of a day. **Poona.**	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn as fraction of a day. **Nasik.**	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn as fraction of a day **Nagpur.**	**Eng. date.**	Eqn. of time in seconds.	☉'s trop long. in seconds.	Total correctn. as fraction of a day. **Baroda.**
			A.D. 1000–1400			**A.D.** 1000–1400			**A.D.** 1000–1400			**A.D** 1000–1400				**A.D.** 1000–1400
247	+163	−1258	−·020	−164	−1360	−·022	+164	−1462	−·023	+164	−1578	−·010	**26**	+165	−1679	−·028
248	153	1285	−·021	154	1388	...	154	1491	−·024	154	1602	−·011	**27**	155	1709	...
249	143	1318	...	144	1416	−·023	144	1520	...	144	1631	...	Nov **28**	145	1739	...
250	138	1340	—·022	134	1444	...	134	1548	−·025	134	1660	−·012	**29**	135	1769	−·029
251	123	1368	...	124	1472	...	124	1577	...	124	1690	...	**30**	125	1798	..
252	118	1395	−·023	114	1500	−·024	114	1605	−·026	114	1719	...	**1**	115	1828	−·030
253	103	1423	...	104	1528	...	104	1634	...	104	1748	−·013	**2**	105	1858	...
254	93	1450	...	94	1556	−·025	94	1663	−·027	94	1777	−·014	**3**	95	1888	−·031
255	83	1478	−·024	84	1584	...	84	1691	...	84	1806	...	**4**	85	1918	...
256	73	1505	...	74	1612	−·026	74	1720	...	74	1836	...	**5**	75	1947	−·032
257	63	1533	−·025	64	1640	...	64	1748	−·028	64	1865	−·015	**6**	65	1977	...
258	53	1560	...	54	1668	−·027	54	1777	...	54	1894	...	**7**	55	2007	−·033
259	43	1588	−·026	44	1696	...	44	1806	−·029	44	1923	−·016	**8**	44	2037	..
260	33	1615	...	34	1724	...	34	1834	...	34	1952	...	**9**	34	2067	−·034
261	23	1643	−·027	24	1752	−·028	24	1863	−·030	24	1982	−·017	**10**	24	2096	...
262	13	1670	...	14	1780	...	14	1891	...	14	2011	...	**11**	14	2126	...
263	2	1698	−·028	2	1808	−·029	2	1920	−·031	2	2040	−·018	**12**	2	2156	−·035
264	−10	1725	...	−10	1836	...	−10	1949	...	−10	2069	...	**13**	−11	2186	...
265	20	1753	...	20	1864	...	20	1977	−·032	20	2098	...	**14**	20	2216	−·036
266	31	1780	...	32	1892	...	32	2006	...	32	2128	...	**15**	32	2245	...
267	40	1808	...	41	1920	−·030	41	2034	...	41	2157	−·019	**16**	42	2275	...
268	50	1835	−·029	51	1948	...	51	2063	...	51	2186	...	**17**	52	2305	...
269	60	1863	...	61	1976	...	61	2092	...	61	2215	...	**18**	63	2335	...
270	69	1890	...	70	2004	...	70	2120	...	70	2244	...	**19**	73	2365	..
271	80	1918	...	81	2032	...	81	2149	...	81	2274	...	December **20**	84	2394	−·037
272	90	1945	−·030	91	2060	...	91	2177	−·033	91	2303	...	**21**	94	2424	...
273	100	1973	...	101	2088	...	101	2206	...	101	2332	...	**22**	104	2454	...
274	102	2000	...	102	2116	...	104	2236	...	101	2360	−·020	**23**	101	2484	...
275	109	2008	...	109	2123	...	108	2242	...	107	2366	...	**24**	107	2489	...
276	115	2015	...	115	2130	−·031	114	2249	...	114	2372	...	**25**	114	2494	−·038
277	122	2023	...	122	2137	...	121	2255	...	120	2378	...	**26**	120	2500	...
278	129	2030	...	129	2144	−·032	128	2262	...	127	2384	...	**27**	127	2505	...
279	135	2038	−·031	135	2151	...	134	2268	−·034	133	2389	...	**28**	133	2510	...
280	142	2046	...	142	2159	.	141	2274	...	140	2395	...	**29**	140	2515	...
281	149	2053	...	149	2166	..	148	2281	...	146	2401	...	**30**	146	2520	...
282	155	2061	...	155	2173	−·033	154	2287	...	153	2407	...	**31**	153	2526	...
283	162	2068	...	162	2180	...	161	2294	...	159	2413	...	**1**	159	2531	...
284	169	2076	...	169	2187	...	168	2300	...	166	2419	...	**2**	166	2536	...
285	175	2084	−·032	175	2194	...	174	2306	...	172	2425	−·021	**3**	172	2541	−·039
286	182	2091	...	182	2201	...	181	2313	−·035	179	2431	...	**4**	179	2546	...
287	189	2099	...	189	2208	...	188	2318	...	185	2437	...	**5**	185	2552	...
288	195	2106	...	195	2215	−·034	194	2326	...	192	2443	...	**6**	192	2557	...
289	202	2114	...	202	2222	...	201	2332	...	198	2448	...	**7**	198	2562	...
290	209	2122	...	209	2230	...	208	2338	...	205	2454	...	**8**	205	2567	...
291	215	2129	−·033	215	2237	...	214	2345	...	211	2460	...	January **9**	211	2572	...
292	222	2137	...	222	2244	...	221	2351	−·036	218	2466	...	**10**	218	2578	...
293	229	2144	...	229	2251	...	228	2358	...	224	2472	...	**11**	224	2583	−·040
294	235	2152	...	235	2258	...	234	2364	...	231	2474	...	**12**	231	2588	...
295	242	2160	...	242	2265	...	241	2370	...	238	2484	...	**13**	237	2593	...
296	249	2167	...	249	2272	...	248	2377	...	245	2490	−·022	**14**	244	2598	−·039
297	255	2175	..	255	2279	...	254	2383	−·035	252	2496	...	**15**	250	2604	...
298	262	2182	...	262	2286	...	261	2390	...	259	2502	...	**16**	257	2609	...
299	269	2190	...	269	2295	..	268	2396	...	266	2508	...	**17**	263	2614	...
300	276	2198	−·032	275	2301	−·033	274	2402	...	272	2513	...	**18**	270	2619	...
301	283	2205	...	282	2308	...	281	2409	...	278	2519	−·021	**19**	276	2624	−·038
302	290	2213	...	289	2315	...	288	2415	−·034	284	2525	...	**20**	283	2630	...
303	297	2220	...	295	2322	...	294	2422	...	290	2531	...	**21**	289	2635	...
304	304	2228	...	302	2328	...	300	2428	...	297	2536	−·020	**22**	295	2640	−·037
305	307	2208	−·031	305	2301	−·032	308	2400	...	300	2506	...	**23**	298	2609	...

TABLE III.—Sunrise from 18° to 22° N. latitude—*cont.*

Day of solar year.	Lat. 18°. Eqn. of time in seconds.	Lat. 18°. ⊙'s trop. long. in seconds.	Long. −428″ = −·005 of day. Total correctn. as fraction of a day. **Satara.** A.D. 1000–1400	Lat. 19°. Eqn. of time in seconds.	Lat. 19°. ⊙'s trop. long. in seconds.	Long. −460″ = −·005 of day. Total correctn. as fraction of a day. **Poona.** A.D. 1000–1400	Lat. 20°. Eqn. of time in seconds.	Lat. 20°. ⊙'s trop. long. in seconds.	Long. −476″ = −·0055 of day. Total correctn. as fraction of a day. **Nasik.** A.D. 1000–1400	Lat. 21°. Eqn. of time in seconds.	Lat. 21°. ⊙'s trop. long. in seconds.	Long. +800″ = +·009 of day. Total correctn. as fraction of a day. **Nagpur.** A.D. 1000–1400	Eng. date.	Lat. 22°. Eqn. of time in seconds.	Lat. 22°. ⊙'s trop. long. in seconds.	Long. −616″ = −·007 of day. Total correctn. as fraction of a day. **Baroda.** A.D. 1000–1400
306	−310	−2178	−·031	−308	−2275	−·032	−306	−2372	−·034	−303	−2477	−·020	**24**	−301	−2578	−·037
307	313	2152	...	311	2268	...	309	2344	−·033	306	2447	...	**25**	304	2546	. .
308	316	2127	..	314	2221	−·031	312	2316	...	309	2417	−·019	**26**	307	2515	−·036
309	319	2102	−·030	317	2194	...	315	2287		312	2388	..	January **27**	310	2484	...
310	322	2077	...	320	2168	...	318	2269	−·032	315	2358	...	**28**	313	2453	...
311	325	2052	...	323	2141	...	321	2231	...	318	2328	−·018	**29**	316	2422	−·035
312	328	2026	−·029	326	2114	−·030	324	2203	..	321	2298	.	**30**	319	2390	. .
313	331	2001		329	2088	...	327	2175	−·031	324	2269	..	**31**	322	2359	...
314	334	1976	...	332	2061	. .	330	2147	..	327	2239	−·017	**1**	325	2328	−·034
315	337	1951	...	335	2034	−·029	333	2119	.	330	2209	...	**2**	328	2297	...
316	340	1926	..	338	2008	...	336	2091	−·030	333	2180	...	**3**	331	2266	...
317	343	1900	−·028	341	1981	...	339	2063	.	336	2150	−·016	**4**	334	2224	−·033
318	346	1875	...	344	1954	. .	342	2035	...	339	2120	..	**5**	337	2208	...
319	349	1850	...	347	1927	...	345	2006	..	342	2090	...	**6**	340	2172	...
320	352	1825	...	350	1901	−·028	348	1978	−·029	345	2061	...	**7**	343	2141	−·032
321	355	1808	−·027	353	1874	...	351	1950		348	2031	−·015	**8**	346	2110	...
322	358	1774	...	356	1847	...	354	1922	...	351	2001	...	**9**	349	2078	...
323	361	1749	...	359	1821	−·027	357	1894	...	354	1972	...	**10**	352	2047	−·031
324	364	1724	−·026	362	1794	..	360	1866	−·028	357	1942	−·014	**11**	355	2016	...
325	367	1699	...	365	1767	. .	363	1838		360	1912	.	**12**	358	1985	...
326	370	1674	...	368	1741	−·026	366	1810	−·027	363	1883	−·013	**13**	361	1954	−·030
327	373	1648	−·025	371	1714	−·025	369	1782	. .	366	1853	.	**14**	363	1922	−·029
328	376	1623	.	374	1687	..	372	1754	−·026	369	1823	−·012	February **15**	365	1891	...
329	379	1698	−·024	377	1660	−·024	375	1725	−·025	371	1793	−·011	**16**	367	1860	−·028
330	382	1573	...	380	1634	..	377	1697	...	373	1764	..	**17**	369	1829	−·027
331	385	1548	−·023	383	1607	...	379	1669	−·024	375	1734	−·010	**18**	371	1798	..
332	388	1522	−·022	385	1580	−·023	381	1641	...	377	1704		**19**	373	1766	−·026
333	391	1497	.	387	1554	−·022	383	1613	−·023	379	1675	−·009	**20**	375	1735	−·025
334	392	1472	−·021	389	1527	. .	385	1585	...	381	1645	−·008	**21**	377	1704	...
335	395	1448	...	391	1500	−·021	387	1556	−·022	383	1616	...	**22**	379	1672	−·024
336	395	1400	−·020	391	1450	...	387	1504	−·021	383	1562	−·007	**23**	379	1616	−·023
337	396	1351	...	392	1400	−·020	388	1452	−·020	381	1508	−·006	**24**	380	1561	...
338	396	1303	−·019	392	1350	..	388	1400	...	384	1454	−·005	**25**	380	1505	−·022
339	397	1255	...	393	1300	−·019	389	1348	−·019	385	1400		**26**	381	1419	−·021
340	397	1206	−·018	393	1250	−·018	389	1296	...	385	1346	..	**27**	381	1393	.
341	398	1158	...	394	1200	...	390	1246	−·018	386	1293	−·004	**28**	382	1338	−·020
342	398	1110	−·017	394	1150	−·017	390	1193	−·017	386	1239	−·003	**1**	382	1282	..
343	399	1026	−·016	395	1100	...	391	1141	..	387	1185	..	**2**	383	1226	−·019
344	399	1013	..	395	1050	−·016	391	1089	−·016	387	1131	−·002	**3**	383	1171	−·018
345	400	965	−·015	396	1000	..	392	1037	...	388	1077	−·001	**4**	384	1115	...
346	400	917	..	396	950	−·015	392	985	−·015	388	1023	.	**5**	384	1059	−·017
347	401	868	−·014	397	900	−·014	393	933	...	389	969	·000	**6**	385	1004	−·016
348	401	820	...	397	850	...	393	881	−·014	389	915	..	March **7**	385	948	...
349	402	772	−·013	398	800	−·013	394	829	−·013	390	861	+·001	**8**	386	892	−·015
350	402	723	..	398	750	..	394	779	.	390	807	.	**9**	386	836	−·014
351	403	675	−·012	399	700	−·012	395	726	−·012	391	754	+·002	**10**	387	781	...
352	403	627	−·011	399	650	−·011	395	674	...	391	700	...	**11**	387	725	−·013
353	404	579	.	400	600	..	396	622	−·011	392	646	+·003	**12**	388	668	
354	404	530	−·010	400	550	−·010	396	570	−·010	392	592	+·004	**13**	388	614	−·012
355	405	482	...	401	500	...	397	518	...	393	538	...	**14**	389	558	...
356	405	434	...	401	450	−·009	397	466	...	393	484	+·005	**15**	389	502	−·011
357	406	385	−·008	402	400		398	414	−·009	394	430	.	**16**	390	447	..
358	406	337	. .	402	350	−·008	398	362	−·008	394	376	+·006	**17**	390	391	−·010
359	407	259	...	403	300	−·007	399	310	−·007	395	322	+·007	**18**	391	335	...
360	407	240	−·007	403	250	. .	399	258	...	395	268	...	**19**	391	279	−·009
361	408	192	−·006	404	200	−·006	400	207		396	215	+·008	**20**	392	224	−·008
362	408	144	...	404	150	...	400	155	−·006	396	161	+·009	**21**	392	168	−·007
363	409	96	−·005	405	100	−·005	401	103	−·005	397	107		**22**	393	178	...
364	409	48	...	405	50	−·004	401	51	−·004	397	53	+·010	**23**	393	57	−·006
365	409	0	−·004	405	0	...	401	0	...	397	0	+·011	**24**	393	0	−·005

TABLE III.—Sunrise from 23° to 27° N. latitude.

	Lat. 23°		Long. −20″ = −·000 of day	**Lat. 24°**		Long. −876″ = −·010 of day.	**Lat. 25°**		Long. +1,736″ = +·020 of day.	**Lat. 26°**		Long. +2,264″ = +·031 of day.		**Lat. 27°**		Long. +1,544′ = +·018 of day.
Day of solar year.	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Indore.** A.D. 1000–1400	Eqn. of time in seconds	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Anhilwad.** A.D. 1000–1400	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day **Benares.** A.D. 1000–1400	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day **Patna** A.D. 1000–1400	**Eng. date**	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Oudh.** A.D. 1000–1400
1	−389	+58	+·003	−384	+60	−·007	−380	+62	+·028	−376	+64	+·034	**25**	−372	+66	+·022
2	387	115	.	383	119	−·006	379	123	+·024	374	128	+·035	**26**	370	182	+·023
3	385	178	+·004	381	179	...	377	185	+·025	373	192	+·036	**27**	368	198	..
4	384	230	+·005	380	238	−·005	376	247	...	372	256	+·037	March. **28**	367	264	+·024
5	382	288	...	378	298	−·004	374	308	+·026	370	319	+·038	**29**	365	329	+·025
6	380	346	+·006	376	358	..	372	370	+·027	368	383	...	**30**	364	395	+·026
7	379	403	+·007	374	417	−·003	370	432	...	366	447	+·039	**31**	362	461	+·027
8	376	461	..	372	477	−·002	368	494	+·028	364	511	+·040	**1**	359	527	...
9	374	518	+·008	370	536	−·001	365	555	+·029	361	575	+·041	**2**	357	598	+·028
10	372	576	+·009	368	596	.	363	617	+·030	359	639	...	**3**	355	659	+·029
11	369	634	...	365	656	·000	361	679	..	357	703	+·042	**4**	353	725	+·030
12	367	691	+·010	363	715	..	358	740	+·031	355	767	+·043	**5**	350	791	...
13	364	749	+·011	360	775	+·001	356	802	+·032	352	831	...	**6**	348	857	+·031
14	362	806		357	834	+·002	353	864	+·033	349	895	+·044	**7**	345	923	+·032
15	359	864	+·012	355	894	+·003	350	925	.	347	958	+·045	**8**	342	988	+·033
16	356	922	+·013	352	954	...	348	987	+·034	344	1022	+·046	**9**	340	1054	+·034
17	353	979	...	349	1013	+·004	345	1049	+·035	341	1086	+·047	**10**	338	1120	+·035
18	350	1037	+·014	346	1073	+·005	342	1111	+·036	338	1150	+·048	**11**	336	1186	...
19	346	1094	+·015	343	1132	+·006	338	1172	+·037	336	1214	..	**12**	334	1252	+·036
20	348	1152	+·016	339	1192	. .	336	1234		334	1278	+·049	**13**	332	1318	+·037
21	340	1210	..	335	1252	+·007	334	1296	+·038	332	1342	+·050	**14**	330	1384	...
22	338	1267	...	383	1311	...	332	1357	.	330	1406		April. **15**	328	1450	+·038
23	336	1325	+·017	331	1371	+·008	330	1419		328	1470	..	**16**	326	1516	...
24	334	1382	..	329	1430	. .	328	1481	+·039	326	1584	+·051	**17**	324	1582	...
25	332	1440	+·018	326	1490	...	326	1542	...	324	1597	...	**18**	322	1648	+·039
26	330	1498	..	324	1550	+·009	324	1604	+·040	322	1661	+·052	**19**	320	1714	...
27	328	1555	...	322	1609	..	322	1666	...	320	1725	...	**20**	318	1780	+·040
28	326	1613	+·019	320	1669	+·010	320	1728	+·041	318	1789	...	**21**	316	1846	...
29	324	1617	...	318	1728	.	318	1789	..	316	1853	+·053	**22**	314	1912	+·041
30	322	1728		316	1788	..	316	1852	..	314	1916	...	**23**	312	1976	.
31	320	1762		314	1823	+·011	314	1888	+·042	312	1954	+·054	**24**	310	2015	+·042
32	318	1795	+·020	312	1857	...	312	1924	.	310	1932	...	**25**	308	2054	...
33	316	1827		310	1892	+·012	310	1960	+·043	308	2029	+·055	**26**	306	2094	+·043
34	314	1859	+·021	308	1926	..	308	1997	.	306	2067	+·056	**27**	304	2133	+·044
35	312	1892	...	305	1960	.	306	2032	+·044	304	2104		**28**	302	2172	.
36	310	1925	..	303	1995	+·013	304	2068		302	2142		**29**	300	2211	...
37	307	1958	+·022	301	2029	+·014	302	2104	+·045	299	2180	+·057	**30**	297	2250	+·045
38	302	1990	...	299	2064	...	297	2141	...	294	2218	...	**1**	292	2290	...
39	296	2024	+·023	293	2098	..	291	2176	+·046	288	2255	+·058	**2**	286	2329	+·046
40	290	2057	+·024	287	2132	+·015	285	2212	...	283	2298	..	**3**	280	2368	...
41	284	2090	...	282	2167	...	279	2248	.	277	2331	+·059	**4**	275	2407	+·047
42	278	2123	+·025	275	2201	+·016	273	2284	+·047	271	2368	..	**5**	269	2446	...
43	272	2155	...	269	2235	..	267	2320	..	265	2406	+·060	**6**	263	2486	+·048
44	266	2187	+·026	263	2270	+·017	261	2356	+·048	259	2444		**7**	257	2525	+·049
45	259	2220	.	257	2304	...	255	2392	+·049	253	2481	+·061	**8**	251	2564	...
46	253	2253	+·027	251	2339	+·018	249	2428	..	247	2519	..	**9**	245	2603	...
47	246	2286	...	244	2373	...	243	2464		240	2557	+·062	**10**	239	2642	+·050
48	240	2318	.	238	2407	+·019	236	2500	+·050	234	2595		May. **11**	232	2682	...
49	234	2352	+·028	232	2442	...	230	2537	..	228	2632	+·063	**12**	226	2721	+·051
50	227	2385	...	225	2476	...	228	2572	+·051	221	2670	...	**13**	220	2760	+·052
51	220	2418	..	218	2411	..	217	2608	..	215	2708	+·064	**14**	218	2799	.
52	214	2451		212	2545	+·020	210	2644	+·052	208	2745	..	**15**	207	2838	...
53	207	2483	+·029	205	2579	+·021	203	2681	...	201	2788	.	**16**	200	2878	...
54	200	2515	...	198	2614	..	197	2716	...	195	2821	..	**17**	193	2917	. .
55	193	2548	...	191	2648	...	190	2752	..	188	2858	...	**18**	186	2956	...
56	186	2581	...	184	2682	...	183	2788	..	181	2896	..	**19**	180	2995	...
57	178	2614	...	177	2717	...	175	2824	...	174	2984	...	**20**	173	3034	+·053
58	174	2646	...	174	2752	...	171	2860	.	171	2972	..	**21**	170	3074	
59	171	2679	...	171	2786	...	168	2896	. .	168	3009	...	**22**	167	3113	...
60	167	2712	..	167	2820	..	165	2932	...	165	3047	...	**23**	164	3152	...
61	163	2744	...	163	2856	...	162	2968	...	162	3084	...	**24**	161	3192	...
62	159	2740	...	159	2852	...	159	2965	...	159	3082	.	**25**	158	3190	...

TABLE III.—Sunrise from 23° to 27° N. latitude—*cont.*

Day of solar year.	Lat. 23°		Long. −20″ = −·000. of day	Lat. 24°		Long. −876″ = −·010 of day.	Lat. 25°		Long +1736″ = +·020 of day	Lat 26°		Long. +2264″ +·031 of day.	Eng. date.	Lat. 27°		Long. +1544″ = +·018 of day.
	Eqn of time in seconds.	☉'s trop long. in seconds	Total correctn. as fraction of a day. **Indore.**	Eqn. of time in seconds.	☉'s trop long. in seconds.	Total correctn. as fraction of a day. **Anhilwad.**	Eqn. of time in seconds.	☉'s trop long. in seconds	Total correctn. as fraction of a day. **Benares.**	Eqn. of time in seconds.	☉'s trop. long in seconds	Total correctn. as fraction of a day **Patna**		Eqn. of time in seconds.	☉'s trop. long. in seconds	Total correctn. as fraction of a day. **Oudh.**
			A.D. 1000–1400			**A.D.** 1000–1400			**A.D.** 1000–1400			**A.D.** 1000–1400				**A.D** 1000–1400
63	−155	+2735	+·029	−155	+2848	+·021	−156	+2962	+·052	−156	+3079	+·064	May **26**	−155	+3189	+·053
64	151	2731	...	151	2844	...	150	2959	...	150	3077	..	**27**	150	3187	...
65	143	2726	...	142	2840	...	142	2956	...	141	3074	...	**28**	147	3186	..
66	134	2722	..	133	2837	...	133	2952	...	133	3072	..	**29**	132	3184	
67	125	2718	...	125	2838	...	124	2949	...	124	3070	..	**30**	123	3182	...
68	116	2713	...	116	2830	...	115	2946	..	115	3067	...	**31**	116	3181	...
69	107	2709	..	106	2825	..	106	2943	..	106	3065	...	**1**	105	3179	.
70	98	2704	...	97	2821	...	97	2940		97	3062	...	**2**	97	3178	..
71	88	2700	...	88	2817	...	88	2937	...	88	3060	+·065	**3**	87	3176	..
72	79	2606	...	79	2813	...	79	2934	...	79	3058	...	**4**	78	3174	...
73	70	2691		70	2809	...	70	2931	..	70	3055	...	**5**	69	3173	+·054
74	61	2686	...	61	2805	.	60	2928	+·053	60	3053	...	**6**	60	3171	..
75	53	2682	.	58	2801	...	52	2925	.	52	3050	...	**7**	52	3170	...
76	42	2678	+·030	42	2797	.	42	2921	...	42	3048	...	**8**	41	3168	...
77	33	2674	...	33	2794	.	33	2918	...	32	3046		**9**	32	3166	..
78	24	2669	...	24	2790		24	2915	...	24	3043		**10**	24	3165	...
79	15	2665	...	15	2786	...	14	2912	...	14	3041	...	**11**	14	3163	...
80	5	2660	...	5	2782	...	5	2909	...	5	3038	..	**12**	5	3162	..
81	+4	2656	...	+4	2778	.	+4	2906	..	+4	3036		**13**	+4	3160	...
82	13	2652	...	13	2774	...	13	2903	...	18	3034	...	**14**	13	3158	...
83	23	2647	...	23	2770	...	22	2900	+·052	22	3031	...	June **15**	22	3157	..
84	32	2643	.	32	2766	...	32	2897		32	3029	.	**16**	2	3155	...
85	42	2638	..	42	2762	..	41	2894	..	41	3026		**17**	41	3154	..
86	51	2634	+·029	50	2758	..	50	2890	...	50	3024	...	**18**	50	3152	+·053
87	60	2630	...	59	2755	+·020	59	2887	...	59	3022	+·064	**19**	59	3150	..
88	69	2625	.	69	2751	...	69	2884	...	68	3019	+·063	**20**	68	3149	+·052
89	78	2621	+·028	78	2747		78	2881	+·051	78	3017	...	**21**	77	3147	...
90	87	2616	...	87	2743	...	87	2878		87	3014		**22**	86	3146	
91	107	2612	...	107	2740	...	108	2876	...	108	3012	+·062	**23**	108	3144	...
92	117	2581	...	118	2709	+·019	118	2844	.	118	2979	...	**24**	119	3111	+·051
93	127	2551	+·027	128	2678	..	128	2812	...	128	2947	..	**25**	129	3077	...
94	137	2520	.	138	2647	..	138	2780	+·050	138	2914	..	**26**	139	3041	
95	147	2490		148	2616	+·018	148	2748	.	148	2882	+·061	**27**	149	3011	...
96	157	2459	...	158	2584	...	158	2717	+·049	158	2849	..	**28**	159	2977	+·050
97	167	2428	...	168	2553	...	168	2685	.	168	2817	..	**29**	169	2944	...
98	177	2398	...	177	2522	.	178	2653	..	178	2784	..	**30**	179	2911	...
99	187	2368	+·026	187	2491	+·017	188	2621	...	188	2752	+·060	**1**	189	2878	.
100	196	2337	...	197	2460		197	2589	..	198	2719	...	**2**	198	2844	+·049
101	206	2306		206	2429	..	207	2557	+·048	207	2687	..	**3**	208	2811	.
102	215	2275	...	216	2398	..	217	2525	..	217	2654	..	**4**	218	2778	..
103	225	2245	+·025	226	2367	...	226	2493	...	227	2622	...	**5**	227	2744	..
104	235	2214	...	235	2336	+·016	236	2461	...	236	2589	...	**6**	237	2711	+·048
105	244	2184	..	244	2305	...	245	2429	+·047	246	2557		**7**	246	2678	..
106	253	2153	+·024	254	2273	...	254	2397	...	255	2524	.	**8**	256	2644	+·047
107	262	2122	...	263	2242	.	263	2366	..	264	2492	+·059	**9**	265	2611	..
108	271	2092	..	272	2211	+·015	273	2334	...	273	2458	...	**10**	274	2578	.
109	280	2061	.	281	2180	..	282	2302	+·046	283	2427	..	**11**	283	2545	...
110	291	2031	+·023	290	2149	.	291	2270	...	292	2394	+·058	**12**	292	2511	+·046
111	298	2000	...	299	2118	.	299	2238	...	300	2362	..	**13**	301	2478	...
112	307	1969	...	308	2087	+·014	308	2206	...	309	2329	.	**14**	310	2445	...
113	315	1939	...	316	2056	...	317	2174	+·045	318	2297	...	**15**	319	2411	...
114	324	1908	+·022	325	2025	.	326	2142	...	327	2264	+·057	**16**	328	2378	+·045
115	333	1878	...	333	1994	+·013	334	2110	+·044	335	2232	...	July **17**	336	2345	...
116	341	1847	..	342	1963	...	343	2078	...	344	2199	.	**18**	344	2311	.
117	349	1816	...	350	1931	...	351	2047	...	352	2167	+·056	**19**	353	2278	+·044
118	358	1786	+·021	358	1900		359	2015	...	360	2134	...	**20**	361	2245	.
119	365	1755	...	366	1869	...	367	1983	+·043	368	2102	+·055	**21**	369	2212	..
120	373	1725	+·020	374	1838	+·012	375	1951	...	376	2069	...	**22**	377	2178	+·043
121	382	1694	...	385	1807	..	387	1919	...	389	2037	.	**23**	391	2145	...
122	390	1664	...	393	1776	+·011	395	1888	+·042	397	2004	...	**24**	400	2112	...
123	397	1631	...	400	1742	...	402	1852	...	404	1966	+·054	**25**	407	2078	+·042
124	405	1599	...	408	1708	..	410	1816	..	412	1929	..	**26**	415	2034	...
125	412	1566	+·019	415	1673	+·010	417	1780	+·041	419	1891	+·053	**27**	422	1994	+·041

TABLE III.—Sunrise from 23° to 27° N. latitude—*cont.*

Day of solar year.	Lat. 23° Eqn. of time in seconds.	Lat. 23° ☉'s trop. long in seconds	Long. −20″ = −·000 of day. Total correctn. as fraction of a day. **Indore** A.D. 1000–1400	Lat. 24° Eqn of time in seconds.	Lat. 24° ☉'s trop long. in seconds.	Long. −876″ = −·010 of day. Total correctn. as fraction of a day. **Anhilwad.** A.D. 1000–1400	Lat. 25° Eqn. of time in seconds.	Lat. 25° ☉'s trop. long. in seconds.	Long. +1,736″ = +·020 of day. Total correctn. as fraction of a day. **Benares.** A.D. 1000–1400	Lat. 26. Eqn. of time in seconds.	Lat. 26. ☉'s trop. long. in seconds.	Long. +2,264″ = +·031 of day. Total correctn. as fraction of a day. **Patna.** A.D. 1000–1400	**Eng. date.**	Lat. 27° Eqn. of time in seconds.	Lat. 27° ☉'s trop. long. in seconds.	Long. +1,544″ = +·018 of day. Total correctn. as fraction of a day. **Oudh.** A.D. 1000–1400
126	+420	+1534	+·019	+422	+1639	+·010	+424	+1741	+·040	+426	+1853	+·053	July **28**	+429	+1955	+·041
127	427	1501	+·018	429	1604	...	431	1708	..	433	1815	...	**29**	436	1916	...
128	434	1469	...	436	1570	.	438	1673	...	440	1778	+·052	**30**	443	1877	+·040
129	441	1436	...	443	1536	+·009	445	1637		447	1740	...	**31**	450	1838	...
130	418	1404	..	450	1502	..	452	1601	..	454	1702		**1**	457	1798	+ 039
131	454	1371	+ 017	456	1467	+·098	458	1565	+·039	460	1665	+·051	**2**	463	1759	...
132	460	1339	...	462	1433	...	464	1529		466	1627	..	**3**	469	1720	...
133	467	1306	...	469	1399	...	471	1493	..	473	1589	+ 050	**4**	176	1681	...
134	473	1274	.	475	1364	...	477	1457	+·038	479	1552	...	**5**	482	1642	+·038
135	479	1241	+·016	481	1330	+ 007	483	1421	. .	485	1514		**6**	488	1602	...
136	485	1209	...	487	1296	.	489	1385	...	491	1476	+·049	**7**	494	1563	+·037
137	490	1176	...	493	1261	+·006	495	1349	+·037	497	1438	...	**8**	500	1524	...
138	496	1144	+·015	499	1227	...	501	1314	...	503	1401	.	**9**	506	1485	+·036
139	502	1111	...	505	1193		507	1278	+·036	509	1363	+·048	**10**	512	1446	...
140	507	1079	...	510	1159	+ 005	512	1242		514	1325	...	**11**	517	1406	..
141	512	1046	+·014	515	1124	...	517	1206	.	519	1288	...	**12**	522	1367	...
142	517	1014	...	520	1090		522	1170	.	524	1250	+·047	**13**	527	1328	+·035
143	522	981	..	525	1056	..	527	1134	+·035	529	1212	...	**14**	532	1289	...
144	527	949	...	530	1021	+ 004	532	1098	...	534	1175	...	**15**	537	1250	+·034
145	531	916	.	535	987	..	537	1062	...	539	1137	+·046	**16**	542	1210	...
146	536	884	+ 013	539	958	...	541	1026	+·034	543	1099	.	August **17**	546	1171	...
147	540	851	...	542	918		545	990	...	517	1061	..	**18**	550	1132	+·033
148	544	819	..	546	884	+·003	546	955	...	552	1024	+·045	**19**	552	1093	...
149	546	786	..	548	850	..	547	919	...	554	986	.	**20**	554	1054	...
150	547	754	+·012	550	816	...	548	883	+ 033	555	918	.	**21**	556	1014	+·032
151	548	721	..	551	781	...	550	847	...	556	911	+·044	**22**	558	975	...
152	549	688	...	552	748	+·002	551	812		558	872	..	**23**	560	936	...
153	550	666	..	553	724		553	786	+ 032	559	814	.	**24**	562	906	...
154	551	644	+·011	555	700	..	554	760	...	560	816	.	**25**	564	876	+·031
155	552	621	...	556	676	+·001	555	733	.	561	788	+·043	**26**	566	845	...
156	553	599	...	557	652	. .	556	707	+·031	563	760	...	**27**	568	815	...
157	554	577	+·010	558	627	...	558	681	. .	565	731	.	**28**	570	785	+·030
158	555	555	...	560	603	...	560	655	...	567	703	...	**29**	572	755	...
159	557	583	.	562	579	...	562	629	.	570	675	+·042	**30**	574	725	..
160	559	510	..	564	555		564	602	...	572	647	...	**31**	576	694	+·029
161	561	488	...	566	531	·000	566	576	.	574	619	+ 041	**1**	578	664	...
162	562	466	...	567	507	...	568	550	+·030	575	591	...	**2**	579	634	...
163	564	444	..	569	483	.	570	524		577	562	...	**3**	581	604	+·028
164	566	422	+ 009	571	459	−·001	572	498		579	535	...	**4**	583	574	...
165	567	399	...	572	435	...	574	471	+ 029	580	507	+·040	**5**	584	543	..
166	567	377	.	572	411	...	576	445	.	580	479	.	**6**	584	513	+·027
167	568	355	+·008	573	386	.	577	419	...	581	450	.	September **7**	585	483	...
168	569	333	...	574	362	− 002	578	393	+·028	582	122	+·039	**8**	586	453	...
169	570	311	...	575	338	...	579	367	..	583	394	.	**9**	587	423	+·026
170	570	288	...	575	314	.	579	310	..	583	366		**10**	587	392	...
171	570	266	+·007	575	290	−·003	579	314	+·027	583	338	+·038	**11**	587	362	...
172	570	244	..	575	266		579	288		583	310		**12**	587	332	+·025
173	570	222	...	575	242	...	579	262		583	282	...	**13**	587	302	...
174	570	200	.	575	218	.	579	236	+·026	583	254	...	**14**	587	272	+·024
175	570	177	+ 006	575	194	−·004	579	209	...	583	226	+·037	**15**	587	241	...
176	570	155	..	575	170	..	579	183		583	198	. .	**16**	587	211	...
177	569	133	+·005	574	145	...	578	157	..	582	169	+·036	**17**	586	181	+·023
178	568	111	...	573	121	−·005	577	131	+·025	581	141	...	**18**	585	151	...
179	567	89	...	572	97		576	105	..	580	113		**19**	584	121	...
180	566	66	...	571	73	..	575	78	..	579	85	+·035	**20**	583	90	+·022
181	564	44	...	569	49	..	573	52	+·024	577	57	...	**21**	581	60	...
182	563	22	+·004	568	25	−·006	572	26	...	576	29	..	**22**	580	30	...
183	562	0	...	566	0	..	570	0		575	0	+·034	**23**	579	0	+·021
184	560	−28	.	564	−25	...	568	−27	+ 023	573	−29	...	**24**	577	−31	...
185	558	46	...	562	50	−·007	566	54	...	571	58	...	**25**	575	62	...
186	556	69	+·008	560	75	...	564	81	...	569	87	+·033	**26**	573	94	+·020

TABLE III.—Sunrise from 23° to 27° N. latitude—cont.

Day of solar year.	Lat. 23°: Eqn. of time in seconds.	Lat. 23°: ☉'s trop long. in seconds.	Long. −20″ = −·000 of day. Total correctn. as fraction of a day. Indore A.D. 1000–1400.	Lat. 24°: Eqn. of time in seconds.	Lat. 24°: ☉'s trop. long. in seconds.	Long. −·876″ = −·010 of day. Total correctn. as fraction of a day. Anhilwad. A.D. 1000–1400.	Lat. 25°: Eqn. of time in seconds.	Lat. 25°: ☉'s trop. long. in seconds.	Long. +1,736″ = +·020 of day. Total correctn. as fraction of a day. Benares. A.D. 1000–1400.	Lat. 26°: Eqn. of time in seconds.	Lat. 26°: ☉'s trop. long. in seconds.	Long. +2,264″ = +·031 of day. Total correctn as fraction of a day Patna. A.D. 1000–1400.	Eng date	Lat. 27°: Eqn of time in seconds.	Lat. 27°: ☉'s trop. long. in seconds.	Long. +1,544″ = +·018 of day. Total correctn as fraction of a day. Oudh A.D. 1000–1400
187	+554	−92	+·003	+558	−100	−·007	+562	−108	+·022	+567	−116	+·033	Sep. **27**	+571	−125	+·020
188	551	114	...	555	124	..	559	135	...	564	145	...	**28**	568	156	+·019
189	548	137	..	552	149	−·008	556	163	...	561	175	+·032	**29**	565	187	...
190	545	160	+·002	549	174	...	553	190	+·021	558	204	...	**30**	562	218	...
191	542	183	...	546	199	..	550	217	...	555	232	...	**1**	559	250	+·018
192	539	206	...	543	224	−·009	547	244	...	552	262	+·031	**2**	556	281	...
193	536	229	..	540	249	...	543	271	...	548	291	...	**3**	552	312	...
194	533	252	+·001	537	274	..	540	298	+·020	545	320	...	**4**	549	343	+·017
195	530	275	...	534	299	−·010	536	325	...	541	349	+·030	**5**	545	374	...
196	526	298	...	530	324	.	532	352	...	537	378	...	**6**	541	406	...
197	522	321	·000	526	349	−·011	528	379	+·019	533	407	...	**7**	537	437	+·016
198	518	343	...	522	373	...	524	406	...	529	436	+·029	**8**	533	468	
199	514	366	−·001	518	398	.	520	434	+·018	525	466	...	**9**	529	499	+·015
200	509	389	...	513	423	...	515	461	...	520	495	+·028	**10**	524	530	...
201	505	412	..	509	448	−·012	511	488	..	515	524	..	**11**	519	562	...
202	501	435	...	505	473	...	507	515	+·017	511	553	...	**12**	515	593	+·014
203	496	458	−·002	500	498	...	502	542	..	506	582	+·027	**13**	510	624	+·013
204	491	481	...	495	523	−·013	497	569	+·016	500	611	...	**14**	504	655	...
205	486	504	...	490	548		492	596	...	495	640	+·026	**15**	499	686	..
206	481	527	−·003	485	573	−·014	487	623	...	490	669	...	**16**	494	718	+·012
207	477	550	−·004	481	598	...	483	650	+·015	486	698	+·025	October. **17**	490	749	...
208	472	572	...	476	622	−·015	478	677	+·014	480	727	...	**18**	484	780	+·011
209	466	595	...	470	647	...	472	705	...	474	757	+·024	**19**	478	811	...
210	461	618	−·005	465	672	−·016	467	732	+·013	468	786	...	**20**	472	842	+·010
211	455	641	...	459	697	...	461	759	...	462	815	+·023	**21**	466	874	+·009
212	450	664	−·006	454	722	−·017	455	786	...	458	844	...	**22**	462	905	+·008
213	446	688	...	450	748	...	452	812	+·012	455	872	+·022	**23**	458	936	...
214	445	721	...	447	782	−·018	449	848	...	452	910	..	**24**	455	975	+·007
215	441	758	−·007	444	817	..	446	884	+·011	449	947	+·021	**25**	452	1014	...
216	434	785	−·003	437	851	−·019	439	920	...	442	985	+·020	**26**	445	1054	...
217	427	818	...	430	885	...	432	956	+·010	435	1023	...	**27**	438	1093	+·006
218	420	850	...	423	919	...	425	991	...	428	1060	...	**28**	431	1132	...
219	412	883	−·009	415	954	−·020	417	1027	+·009	420	1098	+·019	**29**	423	1171	+·005
220	405	915	−·010	408	988	...	410	1063		413	1136	..	**30**	416	1210	...
221	397	948	...	400	1022	−·021	402	1099	+·008	405	1174	+·018	**31**	408	1250	+·004
222	389	980	..	392	1057	...	394	1135	...	397	1211	...	**1**	400	1289	.
223	381	1013	−·011	384	1091	−·022	386	1171	...	389	1249	+·017	**2**	392	1328	+·003
224	373	1045	...	376	1125	...	378	1207	...	381	1287	+·016	**3**	384	1367	+·002
225	365	1078	...	368	1160	...	370	1243	+·006	373	1324	...	**4**	376	1406	
226	357	1110	−·012	360	1194	...	362	1279	...	365	1362	...	**5**	368	1446	+·001
227	348	1143	...	351	1228	−·023	353	1315	+·005	356	1400	+·015	**6**	359	1485	...
228	340	1175	−·013	343	1262	−·024	345	1350	+·004	348	1437	+·014	**7**	351	1524	·000
229	332	1208	..	335	1297	−·025	337	1386	..	340	1475	...	**8**	343	1563	...
230	323	1240	−·014	326	1331	.	328	1422	..	331	1513	+·013	**9**	334	1602	−·001
231	314	1273		317	1365	−·026	319	1458	+·003	322	1551	..	**10**	325	1642	
232	306	1305	−·015	309	1400	...	311	1494	...	314	1588	+·012	**11**	317	1681	−·002
233	297	1338	...	300	1434	−·027	302	1530	...	305	1626	...	**12**	308	1720	−·003
234	287	1370	−·016	290	1468	.	292	1566	.	295	1664	+·010	**13**	298	1759	..
235	278	1403	...	281	1503	..	282	1602	+·001	286	1701	..	**14**	289	1798	...
236	269	1435	−·017	272	1537	−·028	274	1638	...	277	1739	+·009	**15**	280	1838	−·004
237	260	1468	...	263	1571	−·029	265	1674	·000	268	1777	...	November. **16**	271	1877	..
238	251	1500	−·018	254	1605	...	256	1709	−·001	259	1814	...	**17**	262	1916	−·005
239	241	1533	...	245	1640	...	246	1745	...	249	1852	..	**18**	252	1955	..
240	232	1565	...	236	1674	−·030	237	1781	...	240	1890	+·008	**19**	243	1994	−·006
241	222	1598	−·019	226	1708	−·031	227	1817	−·002	230	1928		**20**	233	2034	...
242	213	1630	−·020	217	1743	...	218	1853	...	221	1965	+·007	**21**	224	2073	−·007
243	205	1664	..	205	1776	...	206	1888	−·003	206	2004	...	**22**	207	2112	−·008
244	196	1695	...	196	1807	−·032	197	1920	...	197	2036	+·006	**23**	198	2145	...
245	186	1725	−·021	186	1838	−·033	187	1952	−·004	187	2069	...	**24**	188	2179	−·009
246	176	1756	...	176	1869	...	177	1984	...	177	2101	+·005	**25**	178	2212	...

TABLE III.—Sunrise from 23° to 27° N. latitude—*cont.*

	Lat. 23°		Long. −20″ =−·000 of day.	Lat. 24°		Long. −876″ =−·010 of day.	Lat. 25°		Long. +1,736″ =+·020 of day.	Lat. 26°		Long. +2,264″ =+·031 of day.		Lat. 27°		Long. +1,544″ =+·018 of day.
Day of solar year.	Eqn. of time in seconds.	☉'s trop long. in seconds.	Total correctn. as fraction of a day. **Indore.** A.D. 1000—1400.	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn as fraction of a day. **Anhilwad.** A.D. 1000—1400	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn as fraction of a day **Benares.** A.D. 1000—1400	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Patna.** A.D. 1000—1400.	**Eng. date**	Eqn. of time in seconds.	☉'s trop long in seconds.	Total correctn. as fraction of a day. **Oudh.** A.D. 1000—1400.
247	+166	−1786	−·022	+166	−1900	−·033	+167	−2016	−·005	+167	−2134	+·005	**26**	+168	−2245	−·010
248	156	1817	...	156	1931	−·034	157	2047	...	157	2166	+·004	**27**	158	2278	...
249	146	1848	−·028	146	1963	−·035	147	2079	...	147	2199	...	Nov. **28**	148	2312	...
250	136	1878	...	136	1994	...	187	2111	−·006	187	2231	+·003	**29**	188	2345	−·011
251	126	1909	−·024	126	2025	...	127	2143	−·007	127	2264	..	**30**	128	2378	−·012
252	116	1939	...	116	2056	−·036	117	2175	...	117	2296	+·002	**1**	118	2412	...
253	106	1970	−·025	106	2087	...	107	2207	...	107	2329	...	**2**	108	2445	.
254	96	2001	...	96	2118	−·037	97	2239	−·008	97	2361	+·001	**3**	98	2478	−·013
255	86	2031	−·026	86	2149	...	87	2271	−·009	87	2394	...	**4**	88	2512	−·014
256	76	2062	...	76	2180	−·038	77	2303	...	77	2426	·000	**5**	78	2545	...
257	66	2092	..	66	2211	−·039	67	2335	...	67	2459	...	**6**	68	2578	...
258	56	2123	−·027	56	2242	...	57	2366	−·010	57	2491	−·001	**7**	58	2612	−·015
259	45	2154	−·028	45	2274	−·040	46	2398	−·011	46	2524	...	**8**	47	2645	..
260	35	2184	...	35	2305	...	36	2430	...	36	2556	...	**9**	37	2678	−·016
261	25	2215	...	25	2336	..	26	2462	..	26	2589	−·002	**10**	27	2711	...
262	15	2245	−·029	15	2367	−·041	16	2494	−·012	16	2621	. .	**11**	17	2745	−·017
263	2	2276	−·030	2	2398	...	2	2526	−·013	2	2654	−·003	**12**	2	2778	−·018
264	−11	2307	...	−11	2429	...	−11	2558	...	−11	2686	...	**13**	−11	2811	...
265	20	2337	...	21	2460	...	21	2590	...	21	2719	...	**14**	21	2845	...
266	38	2368	.	38	2491	...	34	2622	...	34	2751	...	**15**	35	2878	...
267	43	2398	...	43	2522	...	44	2654	...	44	2784	−·004	**16**	45	2911	
268	53	2429	...	53	2553	...	54	2685	...	54	2816	...	**17**	55	2944	...
269	64	2460	...	64	2585	...	65	2717	...	65	2849	...	**18**	66	2978	.
270	74	2490	...	74	2616	−·042	75	2749	−·014	75	2881	−·005	**19**	76	3011	−·019
271	85	2521	−·031	85	2647	−·043	86	2781	..	86	2914	...	December **20**	87	3044	...
272	95	2551	...	95	2678	..	96	2818	...	96	2946	...	**21**	97	3078	...
273	100	2582	...	100	2709	..	100	2845	...	100	2979	...	**22**	100	3111	..
274	101	2612	...	101	2740	...	101	2876	...	101	3012	...	**23**	101	3144	...
275	107	2616	...	107	2744	...	107	2879	...	107	3014	.	**24**	107	3146	...
276	113	2621	...	113	2748	...	113	2882	...	113	3017	...	**25**	113	3147	...
277	120	2625	...	120	2752	...	119	2885	..	119	3019	...	**26**	119	3149	...
278	126	2630	...	126	2756	...	126	2888	−·015	125	3022	...	**27**	125	3150	...
279	132	2634	−·032	132	2759	−·044	132	2891	...	131	3024	...	**28**	131	3152	...
280	139	2638	...	139	2763	...	138	2895	...	137	3026	...	**29**	137	3154	...
281	145	2643	...	145	2767	...	144	2898	...	143	3029	...	**30**	143	3155	..
282	151	2647	...	151	2771	−·045	151	2901	...	149	3031	...	**31**	149	3157	..
283	158	2652	...	158	2775	..	157	2904	...	155	3034	...	**1**	155	3158	...
284	164	2656	.	164	2779	...	163	2907	−·016	161	3036	...	**2**	161	3160	..
285	170	2660	−·033	170	2783	...	169	2910	...	167	3038	...	**3**	167	3162	...
286	177	2665	...	177	2787	...	176	2913	...	173	3041	−·006	**4**	173	3163	...
287	183	2669	...	183	2791	...	182	2916	...	179	3043	...	**5**	179	3165	...
288	189	2674	...	189	2795	...	188	2919	...	185	3046	..	**6**	185	3166	...
289	196	2678	−·034	196	2798	...	194	2922	..	191	3048	.	**7**	191	3168	...
290	202	2682	...	202	2802	...	201	2926	.	197	3050	...	January **8**	197	3170	...
291	208	2687	...	208	2806	...	207	2929	...	203	3053	.	**9**	203	3171	...
292	215	2691	...	215	2810	...	213	2932	...	209	3055	...	**10**	209	3173	...
293	221	2696	...	221	2814	...	219	2935	.	215	3058	...	**11**	215	3174	..
294	227	2700	...	227	2818	...	226	2938	−·017	221	3060	−·007	**12**	221	3176	..
295	234	2704	...	234	2822	..	232	2941	...	227	3062	...	**13**	227	3178	−·020
296	240	2709	...	240	2826	...	238	2944	−·016	233	3065	...	**14**	233	3179	...
297	246	2713	−·033	246	2830	...	244	2947	...	239	3067	−·006	**15**	239	3181	...
298	253	2718	...	253	2834	−·044	251	2950	−·015	245	3070	.	**16**	245	3182	...
299	259	2722	...	259	2838	...	257	2953	..	251	3072	−·005	**17**	251	3184	−·019
300	265	2726		265	2841	...	263	2957	...	258	3074	...	**18**	257	3186	...
301	272	2731	−·032	272	2845	...	269	2960	...	265	3077	..	**19**	263	3187	...
302	278	2735	..	278	2849	−·043	276	2963	−·014	272	3079	−·004	**20**	270	3189	...
303	284	2740	...	284	2853	...	282	2966	...	279	3082	...	**21**	277	3190	−·018
304	292	2744	−·031	290	2856	−·042	288	2968	−·013	285	3084	−·003	**22**	283	3192	...
305	294	2711	...	292	2822	...	290	2982	...	287	3046	...	**23**	285	3153	−·017

TABLE III.—Sunrise from 23° to 27° latitude—cont.

	Lat. 23°		Long. − 20″ = − ·000 of day.	Lat. 24°		Long. − 876″ = − ·010 of day.	Lat. 25°		Long. + 1,736″ = + ·020 of day.	Lat. 26°		Long. + 2,264″ = + ·031 of day.		Lat. 27°		Long. + 1,544″ = + ·018 of day.
Day of solar year.	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Indore.**	Eqn. of time in seconds	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Anhilwad.**	Eqn. of time in seconds.	☉'s trop. long in seconds	Total correctn. as fraction of a day. **Benares.**	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Patna.**	**Eng. date.**	Eqn. of time in seconds.	☉'s trop long. in seconds	Total correctn. as fraction of a day. **Oudh.**
			A.D. 1000–1400.			**A.D.** 1000–1400.			**A.D.** 1000–1400.			**A.D.** 1000–1400.				**A.D.** 1000–1400.
306	−297	−2678	−·031	−295	−2787	−·042	−293	−2896	−·013	−290	−3009	−·003	**24** January	−288	−3114	−·017
307	300	2646	...	297	2753	...	295	2860	−·012	292	2971	−·002	**25**	290	3074	−·016
308	303	2613	−·030	300	2718	−·041	298	2824	..	295	2933	..	**26**	293	3035	...
309	305	2580	...	302	2684	...	300	2788	...	297	2895	−·001	**27**	295	2996	−·015
310	308	2547	...	305	2650	...	303	2752	..	300	2858	..	**28**	298	2957	−·014
311	311	2514	−·029	307	2615	−·040	305	2716	−·011	302	2820	...	**29**	300	2918	...
312	314	2482	...	310	2581	.	308	2680	.	305	2782	...	**30**	303	2878	−·013
313	316	2449	−·028	312	2546	−·039	310	2644	−·010	307	2745	...	**31**	305	2839	...
314	319	2416	...	315	2512	...	313	2608	...	310	2707	·000	**1**	308	2800	...
315	322	2383	...	317	2478		315	2572	−·009	312	2669	...	**2**	310	2761	...
316	325	2350	−·027	320	2443	−·038	318	2536	...	315	2632	+·001	**3**	313	2722	−·012
317	327	2318	...	322	2409	..	320	2500	. .	317	2594	...	**4**	315	2682	−·011
318	330	2285	...	325	2374	−·037	323	2464	−·008	320	2556	+·002	**5**	318	2643	...
319	333	2252	−·026	327	2340	..	325	2428	..	322	2518	...	**6**	320	2604	−·010
320	336	2219	...	330	2306	...	328	2392	−·007	325	2481	...	**7**	323	2565	..
321	338	2186	...	332	2271	−·036	330	2356	...	327	2443	+·003	**8**	325	2526	−·009
322	341	2154	−·025	335	2237		333	2320	−·006	330	2405	...	**9**	328	2486	..
323	344	2121	...	337	2202	−·035	335	2284	.	332	2368	+·004	**10**	330	2447	...
324	347	2088	...	340	2168	...	338	2248	...	335	2330	...	**11**	333	2408	−·008
325	349	2055	−·024	342	2134	−·034	340	2212	−·005	337	2292	+·005	**12**	335	2369	−·007
326	352	2022	−·023	345	2099	...	343	2176	...	340	2255	..	**13**	338	2330	..
327	355	1990	...	347	2065	...	345	2140	−·004	342	2217	+·006	**14**	340	2290	−·006
328	358	1957	−·022	350	2030	...	348	2104	−·003	345	2179	+·007	**15**	343	2251	...
329	360	1924	...	353	1996	−·032	350	2068	..	347	2141	+·008	**16** February	345	2212	...
330	363	1891	−·021	356	1962	−·031	353	2032	−·002	350	2104	..	**17**	348	2173	−·005
331	366	1858	−·020	359	1927	.	355	1996	−·001	352	2066	+·009	**18**	350	2134	−·004
332	369	1826	−·019	362	1893	−·030	358	1960		355	2028	+·010	**19**	353	2004	...
333	371	1793	..	365	1858	−·029	361	1924	000	357	1991	+·011	**20**	355	2055	−·003
334	374	1760	−·018	368	1824	..	364	1888	+·001	360	1953	...	**21**	357	2016	−·002
335	376	1728	−·017	371	1788	−·028	367	1852	+·002	363	1916	+·012	**22**	359	1976	−·001
336	376	1670	...	371	1728	−·027	367	1790	...	363	1852	+·013	**23**	359	1910	..
337	377	1613	−·016	372	1669	...	368	1729	+·003	364	1788	+·014	**24**	360	1844	·000
338	377	1555	.	372	1609	−·026	368	1667	+·004	364	1724	...	**25**	360	1778	+·001
339	378	1498	−·015	373	1550	−·025	369	1605	+·005	365	1660	+·015	**26**	361	1712	+·002
340	378	1440	−·014	373	1490	−·024	369	1543	...	365	1596	+·016	**27**	361	1646	+·003
341	379	1382	..	374	1430	..	370	1482	+·006	366	1533	+·017	**28**	362	1581	...
342	379	1325	−·013	374	1371	−·023	370	1420	+·007	366	1469	..	**1**	362	1515	+·004
343	380	1267	−·012	375	1311	−·022	371	1358	+·008	367	1405	+·018	**2**	363	1449	+·005
344	380	1210	−·011	375	1252	...	371	1297	...	367	1341	+·019	**3**	363	1383	+·006
345	381	1152	...	376	1192	−·021	372	1235	+·009	368	1277	+·020	**4**	364	1317	...
346	381	1094	−·010	376	1132	−·020	372	1173	..	368	1213	...	**5**	364	1251	+·007
347	382	1037	.	377	1073	...	373	1112	+·010	369	1149	+·021	**6**	365	1185	+·008
348	382	979	−·009	377	1013	−·019	373	1050	+·011	369	1085	+·022	**7**	365	1119	+·009
349	383	922	−·008	378	954	−·018	374	988	+·012	370	1021	+·023	**8**	366	1053	...
350	383	864	−·007	378	894	..	374	926	...	370	957	.	**9**	366	987	+·010
351	384	806	...	379	834	−·017	375	865	+·013	371	894	+·024	**10** March	367	922	+·011
352	384	749	−·006	379	775	−·016	375	803	+·014	371	829	+·025	**11**	367	856	+·012
353	385	691	−·005	380	715	−·015	376	741	+·015	372	766	...	**12**	368	790	..
354	385	634	...	380	656	...	376	670	...	372	702	+·026	**13**	368	724	+·013
355	386	576	−·004	381	596	−·014	377	618	+·016	373	638	+·027	**14**	369	658	+·014
356	386	518	−·003	381	536	−·013	377	556	+·017	373	574	+·028	**15**	369	592	+·015
357	387	461	...	382	477	.	378	495	...	374	510	...	**16**	370	526	+·016
358	387	403	−·002	382	417	−·012	378	433	+·018	374	446	+·029	**17**	370	460	+·017
359	388	346	...	383	358	−·011	379	371	+·019	375	382	+·030	**18**	371	394	...
360	388	288	−·001	383	298		379	309	+·020	375	318	+·031	**19**	371	328	+·018
361	389	230	...	384	238	−·010	380	248	..	376	255	...	**20**	372	263	+·019
362	389	173	·000	384	179	−·009	380	186	+·021	376	191	+·032	**21**	372	197	..
363	390	115	+·001	385	119	...	381	125	+·022	377	127	+·033	**22**	373	131	+·020
364	390	58	...	385	60	−·008	381	63	...	377	64	...	**23**	373	65	+·021
365	391	0	+·002	386	0	...	382	0	..	378	0	+·034	**24**	374	0	...

TABLE III.—Sunrise from 28° to 32° N. latitude.

Day of solar year.	Lat. 28° Eqn. of time in seconds.	Lat. 28° ☉'s trop. long. in seconds.	Long. + 460″ = + ·005 of day. Total correctn. as fraction of a day. Mathura. A.D. 1000—1400.	Lat. 29° Eqn. of time in seconds.	Lat. 29° ☉'s trop. long. in seconds.	Long. + 352″ = + ·004 of day. Total correctn. as fraction of a day. Delhi. A.D. 1000—1400.	Lat. 30° Eqn. of time in seconds.	Lat. 30° ☉'s trop. long. in seconds.	Long. + 152″ = + ·002 of day. Total correctn. as fraction of a day. Patiala. A.D. 1000—1400.	Lat. 31° Eqn. of time in seconds.	Lat. 31° ☉'s trop. long. in seconds.	Long. + 332″ = + ·004 of day. Total correctn. as fraction of a day. Simla. A.D. 1000—1400.	Eng. date.	Lat. 32° Eqn of time in seconds.	Lat. 32° ☉'s trop. long. in seconds.	Long. − 348″ = − ·004 of day. Total correctn. as fraction of a day. Lahore. A.D. 1000—1400.
1	−367	+ 68	+ ·009	−362	+ 70	+ ·009	−357	+ 72	+ ·007	−353	+ 75	+ ·009	March 25	−348	+77	+ ·002
2	364	136	+ ·010	360	140	+ ·010	355	145	+ ·008	351	149	+ ·010	26	346	154	+ ·003
3	363	204	+ ·011	359	210	+ ·011	354	217	+ ·009	350	224	+ ·011	27	345	230	+ ·004
4	362	272	+ ·012	358	280	...	353	290	+ ·010	348	298	+ ·012	28	344	307	+ ·005
5	360	341	...	356	351	+ ·012	351	362	+ ·011	347	373	+ ·013	29	342	384	+ ·006
6	359	409	+ ·013	354	421	+ ·013	349	434	...	345	447	...	30	340	461	...
7	357	477	+ ·014	352	491	+ ·014	348	507	+ ·012	343	522	+ ·014	31	339	538	+ ·007
8	355	545	+ ·015	351	561	+ ·015	346	580	+ ·013	341	596	+ ·015	1	337	614	+ ·008
9	353	613	...	348	631	...	344	652	+ ·014	339	671	+ ·016	2	335	691	+ ·009
10	351	681	+ ·016	346	701	+ ·016	342	724	+ ·015	337	745	+ ·017	3	333	768	+ ·010
11	348	749	+ ·017	344	771	+ ·017	339	796	+ ·016	335	820	+ ·018	4	330	845	+ ·011
12	346	817	+ ·018	342	841	.	337	869	...	333	894	+ ·019	5	328	922	+ ·012
13	344	885	+ ·019	339	911	+ ·018	335	941	+ ·017	331	969	+ ·020	6	326	998	+ ·013
14	341	953	+ ·020	337	981	+ ·019	332	1014	+ ·018	328	1043	...	7	324	1075	.
15	338	1022	+ ·021	334	1051	+ ·020	329	1086	+ ·019	325	1118	+ ·021	8	321	1152	+ ·014
16	335	1090	+ ·022	331	1122	+ ·021	327	1158	+ ·020	323	1192	+ ·022	9	318	1229	+ ·015
17	333	1158	...	328	1192	+ ·022	324	1231	+ ·021	320	1267	+ ·023	10	316	1306	+ ·016
18	330	1226	+ ·023	324	1262	+ ·023	322	1303	...	318	1341	+ ·024	11	314	1382	+ ·017
19	327	1294	+ ·024	322	1332	+ ·024	320	1376	+ ·022	316	1416	+ ·025	12	312	1459	+ ·018
20	325	1362	...	320	1402	...	318	1448	+ ·023	314	1490	+ ·026	13	310	1536	+ ·019
21	323	1430	+ ·025	318	1472	+ ·025	316	1520	...	312	1565	...	14	308	1613	...
22	321	1498	...	316	1542	...	314	1593	+ ·024	310	1639	+ ·027	15	306	1690	+ ·020
23	319	1566	+ ·026	314	1612	+ ·026	312	1665	...	308	1714	...	16	304	1766	+ ·021
24	317	1634	..	312	1682	..	310	1738	+ ·025	306	1788	+ ·028	17	302	1843	...
25	315	1703	+ ·027	310	1752	+ ·027	308	1810	...	304	1863	...	18	300	1920	+ ·022
26	313	1771	...	308	1822	...	306	1882	+ ·026	302	1937	+ ·029	April 19	298	1997	...
27	311	1839	+ ·028	306	1893	+ ·028	304	1955	..	300	2012	+ ·030	20	296	2074	+ ·023
28	309	1907	..	304	1963	+ ·029	302	2027	+ ·027	298	2086	...	21	294	2150	...
29	307	1975	+ ·029	302	2033	...	300	2099	+ ·028	296	2161	+ ·031	22	292	2227	+ ·024
30	305	2044	...	300	2104	+ ·030	298	2172	+ ·029	294	2236	+ ·032	23	290	2304	+ ·025
31	303	2085	+ ·030	298	2147	...	296	2216	...	292	2283	...	24	288	2352	...
32	301	2126	+ ·031	296	2189	+ ·031	294	2261	+ ·030	290	2329	+ ·033	25	286	2401	+ ·026
33	299	2167	...	294	2232	..	292	2305	...	288	2378	...	26	284	2449	...
34	297	2208	+ 0·32	292	2275	+ ·032	290	2350	+ ·031	286	2422	+ ·034	27	282	2498	+ ·027
35	295	2248	..	290	2317	...	288	2394	...	284	2469	...	28	280	2546	...
36	293	2289	+ ·033	288	2360	+ ·033	286	2439	+ ·032	282	2516	+ ·035	29	278	2595	+ ·028
37	291	2330	...	286	2403	...	284	2483	...	280	2562	...	30	276	2643	+ ·029
38	289	2371	...	284	2446	+ ·034	282	2528	+ ·033	278	2609	+ ·036	May 1	274	2692	...
39	284	2412	+ ·034	281	2488	...	278	2572	...	275	2655	...	2	272	2740	+ ·030
40	278	2453	...	275	2531	+ ·035	273	2617	+ ·034	270	2702	+ ·037	3	267	2789	...
41	273	2494	+ ·035	270	2574	...	267	2661	...	264	2749	+ ·038	4	262	2837	+ ·031
42	266	2535	...	264	2616	+ ·036	261	2706	+ ·035	258	2795	..	5	256	2886	+ ·032
43	261	2576	+ ·036	258	2659	...	256	2750	+ ·036	253	2842	+ ·039	6	250	2934	...
44	255	2617	+ ·037	252	2702	+ ·037	250	2795	...	247	2888	+ ·040	7	245	2983	+ ·033
45	249	2657	...	246	2744	...	244	2839	+ ·037	241	2935	...	8	239	3031	...
46	243	2698	+ ·038	241	2787	+ ·038	238	2884	.	236	2982	+ ·041	9	233	3080	+ ·034
47	237	2739	...	234	2830	+ ·039	232	2928	+ ·038	229	3028	...	10	227	3128	+ ·035
48	231	2780	+ ·039	228	2873	...	226	2973	...	223	3075	+ ·042	11	221	3177	+ ·036
49	224	2821	+ ·040	222	2915	+ ·040	220	3017	+ ·039	217	3121	+ ·043	12	215	3225	...
50	218	2862	...	216	2958	...	214	3062	+ ·040	211	3168	...	13	209	3274	+ ·037
51	211	2903	+ ·041	209	3001	+ ·041	207	3106	+ ·041	205	3215	+ ·044	14	203	3322	...
52	205	2944	...	203	3043	...	201	3151	...	199	3261	...	15	197	3371	+ ·038
53	198	2985	...	196	3086	...	194	3195	...	192	3308	...	16	190	3419	...
54	192	3026	...	190	3129	...	188	3240	...	186	3354	...	17	184	3468	...
55	185	3066	...	183	3171	...	181	3284	...	179	3401	...	18	178	3516	...
56	182	3107	...	181	3214	...	179	3329	...	176	3448	...	19	174	3565	...
57	178	3148	...	177	3257	...	175	3373	...	173	3494	...	20	170	3613	...
58	174	3189	...	173	3300	...	171	3418	..	170	3541	...	21	166	3662	...
59	170	3230	...	169	3342	...	167	3462	...	167	3587	...	22	162	3710	...
60	166	3271	...	165	3385	...	163	3507	...	164	3634	...	23	158	3759	...
61	162	3312	...	161	3428	..	159	3552	...	161	3680	...	24	154	3808	...
62	158	3311	...	157	3428	...	155	3553	...	158	3681	...	25	150	3810	...

TABLE III.—Sunrise from 28° to 32° N. latitude -*cont.*

Day of solar year.	**Lat. 28°** Eqn. of time in seconds.	**Lat. 28°** ☉'s trop. long. in seconds.	Long. + 460″ = + ·005 of day. Total correctn. as fraction of a day. **Mathura.** A.D. 1000–1400.	**Lat. 29°** Eqn. of time in seconds.	**Lat. 29°** ☉'s trop. long. in seconds.	Long. + 352″ = + ·004 of day. Total correctn. as fraction of a day. **Delhi.** A.D. 1000–1400.	**Lat. 30°** Eqn. of time in seconds.	**Lat. 30°** ☉'s trop. long. in seconds.	Long. + 152″ = + ·002 of day. Total correctn. as fraction of a day. **Patiala.** A.D. 1000–1400.	**Lat. 31°** Eqn. of time in seconds.	**Lat. 31°** ☉'s trop. long. in seconds.	Long. + 382″ = + ·004 of day. Total correctn. as fraction of a day. **Simla.** A.D. 1000–1400.	**Eng. date.**	**Lat. 32°** Eqn. of time in seconds.	**Lat. 32°** ☉'s trop. long. in seconds.	Long. − 348″ = − ·004 of day. Total correctn. as fraction of a day. **Lahore.** A.D. 1000–1400.
63	−154	+3310	+·041	−153	+3428	+·041	−151	+3558	+·041	−153	+3683	+·045	**26**	−146	+3813	+·038
64	150	3309	...	149	3428	...	147	3554	...	146	3684	...	May, **27**	142	3815	...
65	141	3308	...	140	3427	...	140	3555	...	139	3686	...	**28**	139	3817	...
66	132	3306	+·042	131	3427	+·042	131	3555	+·042	131	3687	..	**29**	130	3819	+·039
67	128	3305	...	123	3427	...	122	3556	..	122	3689	.	**30**	121	3822	...
68	114	3304	...	114	3427	...	113	3557	...	113	3690	...	**31**	113	3824	..
69	105	3303	...	105	3427	.	104	3558	...	104	3692	.	**1**	104	3826	...
70	96	3302	.	96	3427	...	96	3558	...	95	3693	...	**2**	95	3829	...
71	87	3301	..	87	3427	..	87	3559	...	86	3695	...	**3**	86	3831	..
72	78	3300	...	78	3427	...	78	3560	...	77	3696	..	**4**	77	3833	...
73	69	3299	...	69	3426	..	69	3560		69	3698	...	**5**	68	3836	...
74	60	3298	...	50	3426	...	59	3561	..	59	3699	+·046	**6**	59	3838	...
75	52	3297	...	52	3426	...	52	3562	...	51	3701		**7**	51	3840	...
76	41	3295	..	41	3426	..	41	3562		41	3702	...	**8**	41	3 42	+·040
77	32	3294	...	32	3426	...	32	3563		32	3704	...	**9**	32	3845	...
78	23	3293		23	3426	...	23	3564		23	3705	...	**10**	23	3847	...
79	14	3292	...	14	3426	...	14	3565	...	14	3707	...	**11**	14	3849	...
80	5	3291	+·043	5	3425		5	3565	...	5	3708	...	**12**	5	3852	.
81	+ 4	3290	...	+ 4	3425	...	+ 4	3566	+·043	+ 4	3710	+·047	**13**	+ 4	3854	+·041
82	13	3289	.	13	3425	.	13	3567	...	13	3711	...	**14**	13	3856	...
83	22	3288	+·042	22	3425	..	22	3567	...	22	3713	+·046	**15**	22	3859	+·040
84	32	3287	...	32	3425	+·043	31	3568	+·042	31	3714	..	June, **16**	31	3861	...
85	41	3286	..	41	3425	..	41	3569	..	41	3716	...	**17**	41	3863	+·039
86	50	3284	..	50	3425	+·042	50	3569	...	49	3717	...	**18**	49	3865	...
87	59	3283	+·041	59	3425	.	58	3570	...	58	3719	+·045	**19**	58	3868	...
88	68	3282	...	68	3424	+·041	68	3570	+·041	67	3720	.	**20**	67	3870	...
89	77	3281	...	77	3424	...	77	3571	...	76	3722	+·044	**21**	76	3872	+·038
90	86	3280	...	86	3424	...	85	3572	...	85	3723	...	**22**	85	3875	...
91	109	3280	+·040	109	3424	...	109	3572	+·040	110	3724	...	**23**	110	3876	..
92	119	3246	.	119	3389	+·040	120	3536	...	120	3688	...	**24**	120	3839	+·037
93	129	3212	...	129	3355	...	130	3501	...	130	3652	...	**25**	131	3802	...
94	139	3178	.	140	3320	...	140	3465	...	140	3615	+·043	**26**	141	3765	...
95	149	3144	+·039	150	3285	..	150	3430	+·039	150	3579	...	**27**	151	3728	...
96	159	3110	...	160	3250	+·039	160	3394	...	161	3543	+·042	**28**	161	3691	+·036
97	169	3077	...	170	3216	.	170	3359	...	171	3507	...	**29**	171	3654	
98	179	3043	..	180	3181	...	180	3323	...	181	3471	...	**30**	181	3617	...
99	189	3009	+·038	190	3146	...	191	3288	+·038	191	3431	...	**1**	192	3580	+·035
100	199	2975	...	199	3112	+·038	200	3252	...	201	3398	+·041	**2**	201	3543	...
101	209	2941	+·037	209	3077	+·037	210	3217	...	210	3362		**3**	211	3508	...
102	218	2907	..	219	3042	...	220	3281	+·037	220	3326	.	**4**	221	3469	...
103	228	2873	...	229	3008	...	229	3146	...	230	3290	...	**5**	231	3432	...
104	238	2839	+·036	238	2973	...	239	3110	...	240	3253	+·040	**6**	241	3395	+·034
105	247	2805	..	248	2938	...	249	3075	+·036	249	3217	..	**7**	250	3358	...
106	257	2771	...	257	2903	..	258	3039	...	259	3181	...	**8**	260	3321	+·033
107	266	2738	...	266	2869	+·036	267	3004	...	268	3145	+·039	**9**	269	3284	...
108	275	2704	...	276	2834		277	2968	+·035	277	3109	.	**10**	278	3247	.
109	284	2670	+·035	285	2799	...	286	2933	.	287	3072	+·038	**11**	287	3210	+·032
110	293	2636	...	294	2765	+·035	295	2897	...	296	3036	...	**12**	296	3173	..
111	302	2602	...	303	2730	...	304	2862	...	304	3000	..	**13**	305	3136	...
112	311	2568	+·034	312	2695	...	313	2826	+·034	314	2964	...	**14**	314	3099	+·031
113	320	2534	..	320	2661	...	321	2791	.	322	2928	+·037	**15**	323	3062	..
114	329	2500	...	330	2626	+·034	330	2755	+·033	331	2891	...	**16**	332	3025	+·030
115	337	2466	+·033	338	2591	...	339	2720	...	340	2855	...	**17**	341	2988	...
116	345	2432	...	346	2556	+·033	347	2684	..	348	2819	+·036	July, **18**	349	2951	+·029
117	353	2399		354	2522		355	2649	+·032	357	2783	..	**19**	358	2914	.
118	362	2365	+·032	363	2487	+·032	364	2613	.	365	2747	+·035	**20**	366	2877	+·028
119	370	2331	...	371	2452	...	372	2578	+·031	373	2710	...	**21**	374	2840	...
120	378	2297	...	379	2418	...	380	2542	...	381	2674	+·034	**22**	382	2803	+·027
121	394	2263	+·031	396	2383	...	399	2507	...	402	2638		**23**	390	2766	..
122	402	2228	...	405	2348	+·031	407	2472	+·030	410	2600	+·033	**24**	413	2728	...
123	409	2187	+·030	413	2305	+·030	415	2427	...	418	2553	..	**25**	421	2679	+·026
124	417	2146	...	421	2262	...	423	2383	+·029	426	2506	+·032	**26**	429	2630	...
125	424	2105	+·029	428	2220	...	430	2338	...	433	2460	...	**27**	436	2582	+·025

TABLE III.—Sunrise from 28° to 32° N. latitude—*cont.*

Day of solar year.	Lat. 28° Eqn. of time in seconds	Lat. 28° ☉'s trop long in seconds	Total correctn. as fraction of a day. **Mathura.** Long. + 460″ = + ·005 of day. A.D. 1000—1400.	Lat. 29° Eqn. of time in seconds	Lat. 29° ☉'s trop long. in seconds	Total correctn. as fraction of a day. **Delhi.** Long. + 352″ = + ·004 of day A.D. 1000—1400.	Lat. 30° Eqn. of time in seconds.	Lat. 30° ☉'s trop. long in seconds.	Total correctn. as fraction of a day. **Patiala.** Long. + 152″ = + ·002 of day. A.D. 1000—1400.	Lat. 31° Eqn. of time in seconds.	Lat. 31° ☉'s trop long in seconds	Total correctn. as fraction of a day. **Simla.** Long. + 332″ = + ·004 of day. A.D. 1000—1400.	Eng. date.	Lat. 32° Eqn. of time in seconds.	Lat. 32° ☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Lahore.** Long. − 348″ = − ·004 of day. A.D. 1000—1400.
126	+ 483	+ 2064	+ ·029	+ 436	+ 2177	+ 029	+ 438	+ 2293	+ ·029	+ 441	+ 2413	+ 032	July **28**	+ 444	+ 2533	+ ·025
127	440	2023	...	444	2134	...	445	2248	+ 028	449	2306	+ ·031	**29**	452	2484	+ 024
128	447	1983		451	2091	+ ·028	453	2204	.	456	2319	..	**30**	459	2435	..
129	454	1942	+ ·028	458	2048	...	460	2159	+ 027	463	2272	+ ·030	**31**	466	2386	+ ·023
130	461	1901	...	465	2006	+ ·027	467	2114	.	470	2226		**1**	473	2338	..
131	467	1860	+ ·027	471	1963	...	474	2070		477	2179	...	**2**	480	2289	..
132	473	1819	...	477	1920	...	481	2025	+ 026	484	2182	+ 029	**3**	487	2240	+ 022
133	480	1778	...	484	1877	+ ·026	488	1980	...	491	2085	.	**4**	494	2191	+ ·021
134	486	1737	+ ·026	490	1834	...	494	1936	+ ·025	497	2038	+ 028	**5**	500	2142	...
135	492	1696	.	496	1792	+ ·025	500	1891	+ 024	503	1992	+ ·027	**6**	506	2094	+ ·020
136	498	1655	+ ·025	502	1749	...	506	1846	...	509	1945	...	**7**	512	2045	..
137	504	1614		508	1706	+ ·024	512	1801	+ 023	515	1898	...	**8**	518	1996	.
138	510	1574	+ ·024	514	1668	...	518	1757	...	521	1851	+ 026	**9**	524	1947	+ ·019
139	516	1533	...	520	1620	...	524	1712		527	1804	...	**10**	530	1898	...
140	521	1492	...	525	1578	+ ·023	529	1667	+ 022	532	1758	+ ·025	**11**	535	1850	+ ·018
141	526	1451	+ ·023	530	1535	...	534	1624	...	538	1711	..	**12**	541	1801	...
142	531	1410	.	585	1492	+ ·022	539	1578	+ 021	543	1664	+ 024	**13**	546	1752	+ 017
143	536	1369	+ ·022	540	1449	...	544	1583	...	548	1617	...	**14**	551	1703	+ ·016
144	541	1328	..	545	1406	...	549	1489	+ 020	553	1570	+ ·023	**15**	556	1654	..
145	546	1287	...	550	1364	+ ·021	554	1444	...	558	1524	.	**16**	561	1606	+ 015
146	550	1246	+ 021	554	1321	...	558	1399	.	562	1477		August **17**	566	1557	...
147	554	1205	...	558	1278	+ ·020	562	1354	+ 019	566	1430	+ 022	**18**	571	1508	...
148	556	1165	+ ·020	560	1235	...	564	1310	...	568	1383	...	**19**	574	1459	+ ·014
149	558	1124	..	562	1192	.	566	1265	...	570	1336	+ 021	**20**	576	1410	..
150	560	1083	..	564	1150	..	568	1220	+ 018	572	1290	.	**21**	578	1362	...
151	562	1042	..	566	1107	+ 019	570	1176	.	574	1243	+ ·020	**22**	580	1313	+ ·013
152	564	1000	...	568	1064	...	572	1132	...	576	1196	...	**23**	582	1264	...
153	566	968	+ ·019	570	1020	+ ·018	574	1095	+ 017	578	1157		**24**	584	1223	+ ·012
154	568	936	.	572	995	...	576	1059	...	580	1119	+ 019	**25**	586	1182	..
155	570	903	+ ·018	574	961	..	578	1022	+ ·016	582	1080	...	**26**	588	1142	.
156	572	871	...	576	927	+ ·017	580	986	...	585	1042	+ 018	**27**	590	1101	+ ·011
157	574	839	...	578	892	..	583	949	+ 015	587	1003		**28**	592	1060	...
158	577	807	+ ·017	581	858	..	586	913	...	590	964	+ 017	**29**	595	1019	+ ·010
159	579	775	...	583	824	+ 016	588	876	...	592	926	...	**30**	597	978	
160	581	742	..	585	790	.	590	840	.	594	887	...	**31**	599	938	+ ·009
161	583	710	+ ·016	587	755	...	592	803	+ 014	596	849	...	**1**	601	897	
162	584	678	...	589	721	+ ·015	593	767	...	597	810	+ ·016	**2**	602	856	+ ·008
163	586	646	...	590	687	...	595	730	+ 013	599	771	...	**3**	604	815	..
164	588	614	+ ·015	592	652	+ ·014	597	694	...	601	733	+ ·015	**4**	606	774	...
165	589	581		593	618	...	598	657	...	602	694	...	**5**	607	734	+ ·007
166	589	549	+ 014	593	584	+ 013	598	621	+ 012	602	656	+ ·014	**6**	607	693	...
167	590	517	.	594	549	...	599	584	...	603	617	..	**7**	608	652	+ ·006
168	591	485	...	595	515	...	600	548	+ ·011	604	578	+ ·013	**8**	609	611	...
169	592	453	+ ·013	596	481	+ ·012	601	511	...	605	540	...	September **9**	610	570	+ ·005
170	592	420	..	596	447	...	601	475	+ 010	605	501	...	**10**	610	530	...
171	592	388	...	596	412	...	601	438	..	605	463	+ 012	**11**	610	489	+ ·004
172	592	356	+ ·012	596	378	+ ·011	601	402	...	605	424		**12**	610	448	...
173	592	324	+ 011	596	343	+ 010	601	365	+ 009	605	385	+ ·011	**13**	610	407	+ ·003
174	592	292	+ ·010	596	309	..	601	329	...	605	347		**14**	610	366	
175	592	259	.	596	275	...	601	292	+ ·008	605	308	+ ·010	**15**	610	326	+ 002
176	592	227	...	596	241	.	601	256	.	605	270	..	**16**	610	285	...
177	591	195	+ ·009	595	206	+ ·009	600	219	...	604	231	+ ·009	**17**	609	244	+ ·001
178	590	163	...	594	172	...	599	183	+ ·007	603	192	...	**18**	608	203	...
179	589	131	+ ·008	593	138	+ ·008	598	146	...	602	154	+ 008	**19**	607	162	·000
180	588	98	..	592	104	...	597	110	+ ·006	601	115	...	**20**	606	122	...
181	586	66	..	590	69	+ 007	595	73	...	599	77	.	**21**	604	81	− ·001
182	585	34	+ ·007	589	33	...	594	37	+ ·005	598	38	+ 007	**22**	603	40	...
183	584	0	...	588	0	...	593	0	...	598	0	...	**23**	603	0	− ·002
184	582	− 33	..	586	− 35	+ ·006	591	− 38	+ 004	596	− 40	+ 006	**24**	601	− 42	...
185	580	67	+ ·006	584	71	...	589	75	...	594	80	...	**25**	599	84	− ·003
186	578	100	...	582	106	+ ·005	587	113	+ ·003	592	120	+ ·005	**26**	597	126	[illegible]

TABLE III.—Sunrise from 28° to 32° N. latitude—*cont.*

Day of solar year.	Lat. 28°: Eqn. of time in seconds.	Lat. 28°: ☉'s trop. long. in seconds.	Long. + 460″ = + ·005 of day. Total correctn. as fraction of a day. **Mathura.** A.D. 1000—1400.	Lat. 29°: Eqn. of time in seconds.	Lat. 29°: ☉'s trop long. in seconds.	Long. + 362″ = + ·004 of day. Total correctn. as fraction of a day. **Delhi.** A.D. 1000—1400.	Lat. 30°: Eqn. of time in seconds.	Lat. 30°: ☉'s trop. long. in seconds.	Long. + 152″ = + ·002 of day. Total correctn. as fraction of a day. **Patiala.** A.D. 1000 1400.	Lat. 31°: Eqn. of time in seconds.	Lat. 31°: ☉'s trop. long. in seconds.	Long. + 332″ = + ·004 of day. Total correctn. as fraction of a day. **Simla.** A.D. 1000—1400	**Eng. date.**	Lat. 32°: Eqn of time in seconds	Lat. 32°: ☉'s trop long. in seconds.	Long. − 348″ = − ·004 of day. Total correctn as fraction of a day. **Lahore.** A.D. 1000—1400.
187	+576	−133	+ ·005	+ 580	−142	+ ·005	+585	−151	+ ·003	+590	−160	+ ·005	**27**	+595	−168	− ·004
188	573	166	...	577	177	...	582	188	.	587	199	+ ·004	Sep **28**	592	210	..
189	570	200	...	574	213	+ 004	579	226	+ ·002	584	239	...	**29**	589	253	− ·005
190	567	233	+ ·004	571	248	...	576	264	..	581	279	+ ·003	**30**	586	295	
191	564	266		568	284	+ ·003	573	302	+ ·001	578	319		**1**	583	387	− ·006
192	561	300	...	565	319	...	570	339	..	575	359	+ 002	**2**	580	379	..
193	557	333	..	561	355	...	566	377	·000	571	399	..	**3**	576	421	
194	554	366	...	558	390	+ ·002	568	415	...	568	439	...	**4**	573	168	− ·007
195	550	400	+ ·003	554	426	..	559	452	− ·001	564	479	+ 001	**5**	569	505	...
196	546	433	..	550	461	+ ·001	555	490	...	560	519	.	**6**	565	517	− ·008
197	542	466	...	546	497	..	551	528	− ·002	556	559	·000	**7**	561	589	− ·009
198	538	499	+ ·002	542	532	...	547	565	.	552	598	− ·001	**8**	557	631	.
199	534	533	...	538	568	·000	543	603	− ·003	548	638	.	**9**	553	674	− ·010
200	529	566	+ ·001	533	603	...	538	641		543	678	...	**10**	548	716	...
201	524	599	...	528	639	− ·001	533	679	− ·004	588	718	− ·002	**11**	543	758	− ·011
202	520	633	·000	524	674	− ·002	529	716	..	534	758	− ·003	**12**	539	800	
203	515	666	...	519	710	...	524	754	− ·005	529	798		**13**	534	842	− 012
204	509	699	− 001	513	745	− ·003	518	792	.	523	838	− ·004	October **14**	528	884	...
205	504	733	..	508	781		513	829	− ·006	518	878	− ·005	**15**	523	926	− ·013
206	499	766	− ·002	503	816	− ·004	508	867		513	918	...	**16**	518	968	− 014
207	495	799	...	499	852	...	504	905	− ·007	509	958	− ·006	**17**	514	1010	− 015
208	489	832	− ·003	493	887	− ·005	498	942	..	503	997		**18**	508	1052	..
209	483	866	...	487	923	.	492	980	− ·008	497	1037	− ·007	**19**	502	1095	− ·016
210	477	899	− ·004	481	958	...	486	1018	.	491	1077	.	**20**	496	1137	
211	471	932	− ·005	477	994	− ·006	480	1056	− 009	485	1117	− ·008	**21**	490	1179	− ·017
212	468	966	...	473	1029	− ·007	474	1093	− ·010	479	1157	− ·009	**22**	483	1221	.
213	465	1000	− ·006	469	1064	..	478	1132	..	478	1196	− ·010	**23**	481	1264	− 018
214	462	1041	...	465	1107	− ·008	467	1177	·011	471	1243	− ·011	**24**	474	1318	− ·019
215	455	1082	− ·007	458	1150	...	460	1221	− ·012	464	1290	...	**25**	467	1362	− ·020
216	448	1123	...	451	1192	− 009	453	1266	..	457	1336	− ·012	**26**	460	1410	..
217	441	1164	...	444	1235	.	446	1311	− ·013	450	1383	− ·013	**27**	453	1459	− ·021
218	434	1204	− ·008	437	1278	− ·010	439	1355	− ·014	448	1430	...	**28**	446	1508	...
219	426	1245	...	429	1321	− ·011	431	1400	...	435	1477	− 014	**29**	438	1557	− ·022
220	419	1286	− ·009	422	1364	.	424	1445	− ·015	428	1524	...	**30**	431	1606	− 023
221	411	1327	...	414	1406	− ·012	416	1490	...	420	1570	− ·015	**31**	423	1654	− ·024
222	403	1368	− ·010	406	1449	..	408	1534	− ·016	412	1617	− ·016	**1**	415	1703	...
223	395	1409	− ·011	398	1492	− 013	400	1579	− ·017	404	1664	..	**2**	407	1752	− ·025
224	387	1450	− ·012	390	1535		392	1624	...	396	1711	− 017	**3**	399	1801	− ·026
225	379	1491	...	382	1578	− ·014	384	1668	− 018	388	1758	− ·018	**4**	391	1850	...
226	371	1532	− ·013	374	1620	− ·015	376	1713	..	380	1804	...	**5**	383	1898	− ·027
227	362	1573	...	365	1663		367	1758	− ·019	371	1851	− ·019	**6**	374	1947	...
228	354	1613	− ·014	357	1706	− 016	359	1802	...	363	1898	− 020	**7**	366	1996	− ·028
229	345	1654	.	348	1749	− ·017	350	1847	− ·020	354	1945		**8**	357	2045	− ·029
230	336	1695	− ·015	339	1792	.	341	1892	− 021	345	1992	− ·021	**9**	348	2094	− ·030
231	327	1736	..	330	1834	− ·018	332	1937	...	336	2038	...	**10**	339	2142	...
232	318	1777	− ·016	321	1877	...	323	1981	− ·022	327	2085	− ·022	November. **11**	330	2191	− ·031
233	309	1818	− ·017	312	1920	− 019	314	2026	− ·023	318	2132	− ·023	**12**	321	2240	...
234	299	1859	...	302	1963	− ·020	304	2071	...	308	2179		**13**	311	2289	− ·032
235	290	1900	− ·018	293	2006	...	295	2115	− 024	299	2226	− 024	**14**	302	2338	− ·033
236	281	1941	...	284	2048	− ·021	286	2160	...	290	2272	...	**15**	293	2386	..
237	272	1982	− ·019	275	2091	...	277	2205	− ·025	281	2319	− ·025	**16**	284	2435	...
238	262	2022	− ·020	265	2134	− ·022	267	2249	− ·026	271	2366	− ·026	**17**	274	2484	− ·034
239	252	2063	..	255	2177	..	257	2294	..	261	2413	...	**18**	264	2533	.
240	243	2104	...	246	2220	− ·023	248	2339	...	252	2460	...	**19**	255	2582	− ·035
241	233	2145	− ·021	236	2262	...	238	2384	− ·027	242	2506	− ·027	**20**	244	2630	...
242	223	2186	− ·022	226	2305	− ·024	228	2428	− ·028	232	2553	− ·028	**21**	234	2679	− ·036
243	207	2228	...	208	2348	...	208	2472	...	209	2600	...	**22**	210	2728	− ·037
244	198	2262	...	199	2383	− ·025	199	2507	...	200	2636	− ·029	**23**	201	2765	− ·038
245	188	2296	− ·023	189	2417	− ·026	189	2543	− ·029	190	2672	..	**24**	191	2802	...
246	178	2330	− ·024	179	2452	...	179	2578	− ·030	180	2709	− ·030	**25**	181	2839	− ·039

TABLE III.—Sunrise from 28° to 32° N. latitude—*cont.*

Day of solar year.	Lat. 28: Eqn. of time in seconds.	Lat. 28: ☉'s trop. long. in seconds.	Long +460″ =+ ·005 of day. Total correctn. as fraction of a day. **Mathura.** A.D. 1000–1400.	Lat 29: Eqn. of time in seconds.	Lat 29: ☉'s trop long in seconds.	Long. +352″ =+ ·004 of day. Total correctn. as fraction of a day. **Delhi.** A.D. 1000–1400.	Lat 30°: Eqn. of time in seconds	Lat 30°: ☉'s trop. long. in seconds.	Long. +152″ =+ ·002 of day. Total correctn. as fraction of a day. **Patiala.** A.D. 1000–1400	Lat. 31: Eqn. of time in seconds	Lat. 31: ☉'s trop. long. in seconds.	Long. +332″ =+ ·004 of day Total correctn. as fraction of a day. **Simla.** A.D. 1000–1400	**Eng. date.**	Lat. 32°: Eqn. of time in seconds	Lat. 32°: ☉'s trop. long. in seconds.	Long. –348″ =– ·004 of day. Total correctn. as fraction of a day. **Lahore.** A.D. 1000–1400
247	+168	–2364	– ·024	+169	–2487	– ·027	+169	–2614	– ·080	+170	–2715	– ·030	November **26**	+ 171	–2876	– ·039
248	158	2387	...	159	2521		159	2649	– ·031	160	2781	...	**27**	161	2913	– ·040
249	148	2481	– ·025	149	2556	...	149	2685		150	2817	– ·031	**28**	151	2950	...
250	188	2465	– ·026	139	2591	– 028	139	2720	– ·082	140	2853	– ·082	**29**	141	2987	– ·041
251	128	2499		129	2626	– ·029	129	2756	...	130	2890	...	**30**	131	3024	– ·042
252	118	2533	..	119	2660	...	119	2791	– ·033	120	2926	...	**1**	121	3061	...
253	108	2567	– ·027	109	2695	– ·030	109	2827	...	110	2962	– ·038	**2**	111	3098	...
254	98	2601	– ·028	99	2730	...	99	2862	– ·034	100	2998	.	**3**	101	3135	– ·043
255	88	2685	..	89	2764	– ·031	89	2898	.	90	3034	– ·034	**4**	91	3172	– ·044
256	78	2669	...	79	2799	...	79	2933	– ·035	80	3071	..	**5**	81	3209	– 045
257	68	2703	– ·029	69	2834	– ·032	69	2969	.	70	3107	– ·035	**6**	71	3246	..
258	58	2786	– ·080	59	2868	– ·033	59	3004	– ·036	60	3143	– ·036	**7**	61	3283	– ·046
259	47	2770	...	48	2903	...	48	3040	– ·037	49	3179	...	**8**	50	3320	...
260	37	2804	– ·031	38	2938	...	38	8075	...	39	3215	– ·037	**9**	40	3357	..
261	27	2838	...	28	2978	– 034	28	3111	...	29	3252		**10**	30	3394	– 047
262	17	2872	...	18	3007	– ·085	18	3146	– ·038	19	3288	– ·088	**11**	20	3431	...
263	2	2906	– 082	2	3042	...	2	3182	..	2	3324	...	**12**	4	3468	– ·048
264	– 11	2940	– ·033	– 11	3077	..	–11	3217	– ·039	– 11	3360	– ·039	**13**	–12	8505	– ·049
265	21	2974	...	21	3111	...	21	3253	– ·040	21	8896		**14**	28	3542	.
266	85	3008	..	86	3146	.	36	3288		37	3483	...	**15**	38	3579	...
267	45	3042	...	46	8181	– ·036	46	3324	...	47	3469	...	December **16**	48	3616	...
268	55	8075	...	56	8215	...	56	3359	...	57	3505	..	**17**	58	3653	...
269	66	3109	...	67	8250	...	67	3395	..	68	3541		**18**	69	3690	...
270	76	8143	...	77	3285	.	77	3430	...	78	3577	...	**19**	79	3727	...
271	87	3177	...	88	3320	...	88	3466	...	89	8614	...	**20**	90	3764	...
272	97	3211	...	98	8354	...	98	3601	...	99	3650	...	**21**	100	3801	...
273	107	3245	...	108	3890		108	3537	..	109	3686	...	**22**	110	3838	..
274	100	8280	..	100	3424	.	100	3572	..	98	3724	...	**23**	98	3876	..
275	106	3281	.	106	3424	.	106	3571	...	104	3722	...	**24**	104	3874	...
276	112	3282	...	112	8124	...	112	3571	...	110	3721	...	**25**	110	3871	...
277	118	3283	.	118	3424	...	118	3570	...	116	3719	...	**26**	116	3869	– ·050
278	124	8284		124	3424		124	3569	...	122	3718	...	**27**	122	3867	...
279	130	3285	– ·084	130	3425	– ·037	130	3568	. .	128	3716	– ·040	**28**	128	3864	
280	136	3287	..	136	3425	...	136	3568	...	134	3715		**29**	134	3862	...
281	142	3288	...	142	3425	..	142	3567	..	140	3713	...	**30**	140	3860	...
282	148	8289	.	148	3425		148	3566	...	146	3712	...	**31**	146	3858	..
283	154	3290	...	154	3425	...	154	3566	.	152	3710	...	**1**	152	3855	...
284	160	3291		160	8425	.	160	3565	..	158	3709	...	**2**	158	3853	
285	166	8292	...	166	8425	...	166	3564	...	164	3707		**3**	164	3850	..
286	172	3293	...	172	3426	...	172	3564		170	3706	...	**4**	170	3848	...
287	178	3294	.	178	3426	.	178	3563	...	176	3704	...	**5**	176	3846	.
288	184	3295	...	184	3426	...	184	3562	...	182	3703	...	**6**	182	3844	...
289	190	3296		190	3426	...	190	3561	...	188	3701	.	**7**	188	3841	...
290	196	3298	...	196	3126	. .	196	3561	..	194	8700	...	**8**	191	3839	..
291	202	3299	...	202	3426	...	202	8560	...	200	3698	...	**9**	200	3837	...
292	208	3300	...	208	3426	...	208	3559	...	206	8697	...	January **10**	206	3835	...
293	214	8301	...	214	3426	– ·038	214	3559	...	212	3695	– ·041	**11**	212	3832	...
294	220	3302	...	220	3426	. .	220	3558	..	218	3694	..	**12**	218	3830	...
295	226	3303	...	226	3427	...	226	3557	– ·041	224	3692	...	**13**	223	3828	...
296	232	8304	– ·085	232	3427	– ·037	232	3557	...	230	3691	– ·040	**14**	229	3825	...
297	238	3305	...	238	8427	...	238	8556	– ·010	235	3689	...	**15**	234	3823	– ·049
298	244	3306	– ·034	244	3127	– ·086	244	3555	..	240	3688	– ·089	**16**	239	3821	...
299	250	3307	.	250	3427	...	250	3554	– ·039	245	3686	.	**17**	244	3818	– ·048
300	256	8309	...	256	8427	– ·085	255	3554	. .	250	3685	– ·088	**18**	249	3816	– ·047
301	262	3310	– ·088	262	3427	...	260	3553		255	3683	..	**19**	254	8814	.
302	268	3311	..	268	8428	– ·034	265	3552	– ·088	260	8682	...	**20**	260	3812	...
303	274	3812	– ·082	278	3428	...	270	3552	..	266	3680	– ·087	**21**	265	3809	– ·046
304	280	3312	...	278	3428	– ·033	276	3552	– ·037	272	3680	– ·036	**22**	270	3808	...
305	282	3271	– ·081	280	3385	...	278	8507	...	274	8633	...	**23**	272	3759	– ·045

TABLE III.—Sunrise from 28° to 32° N. latitude—*cont.*

	Lat. 28°		Long. +460″ =+·005 of day.	**Lat. 29°**		Long. +352″ =+·004 of day.	**Lat. 30°**		Long. +152″ =+·002 of day.	**Lat. 31°**		Long. +332″ =+·004 of day.		**Lat. 32°**			Long. −348″ =−·004 of day.
Day of solar year.	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Mathura.** A.D. 1000—1400.	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Delhi.** A.D. 1000—1400.	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Patiala.** A.D. 1000—1400.	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Simla.** A.D. 1000—1400.		**Eng. date.**	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Lahore.** A.D. 1000—1400.
306	−285	−3230	−·031	−283	−3343	−·032	−280	−3463	−·036	−276	−3587	−·035		**24**	−274	−3711	−·045
307	287	3189	−·030	285	3300	...	283	3418	...	279	3540	.		**25**	276	3662	−·044
308	290	3148	..	288	3257	−·031	285	3374	−·035	281	3494	−·034		**26**	278	3614	−·043
309	292	3107	−·029	290	3214	...	287	3329		283	3447	...		**27**	281	3565	...
310	295	3067	...	293	3172	−·030	290	3285	−·034	286	3400	−·033	January.	**28**	283	3517	−·042
311	297	3026	..	295	3129	...	292	3240	..	288	3354	..		**29**	285	3468	...
312	300	2985	...	298	3086	...	294	3196	−·033	290	3307	−·032		**30**	287	3420	−·041
313	302	2944	−·028	300	3044	...	297	3151	...	293	3261	..		**31**	289	3371	...
314	305	2903	..	303	3001	...	299	3107	..	295	3214	−·031		**1**	292	3323	−·040
315	307	2862	−·027	305	2958	−·029	301	3062	−·032	297	3167	...		**2**	294	3274	−·039
316	310	2821	...	308	2916	...	304	3018	...	300	3121	−·030		**3**	296	3226	...
317	312	2780	−·026	310	2873	−·028	306	2973	−·031	302	3074	...		**4**	298	3177	−·038
318	315	2739	...	313	2830	...	308	2929	.	304	3028	−·029		**5**	300	3129	−·037
319	317	2698	−·025	315	2787	−·027	311	2884	−·030	307	2981	...		**6**	303	3080	...
320	320	2658	...	318	2745	...	313	2840	...	309	2934	−·028		**7**	305	3032	−·036
321	322	2617	−·024	320	2702	−·026	315	2795	−·029	311	2888	...		**8**	307	2983	..
322	325	2576	...	323	2659	...	318	2751	...	314	2841	−·027		**9**	309	2935	−·035
323	327	2535	−·023	325	2617	−·025	320	2706	−·028	316	2795	...		**10**	311	2886	...
324	330	2494	...	328	2574	...	322	2662	...	318	2748	−·026		**11**	314	2838	−·034
325	332	2453	−·022	330	2531	−·024	325	2617	−·027	321	2701	...		**12**	316	2789	−·033
326	335	2412	−·021	332	2489	−·023	327	2573	−·026	323	2655	−·025		**13**	318	2741	−·032
327	337	2371	..	334	2446	−·022	329	2528	..	325	2608	−·024		**14**	320	2692	−·031
328	340	2330	−·020	336	2403	−·021	331	2484	−·025	327	2562	−·023		**15**	322	2644	−·030
329	342	2289	−·019	338	2360	...	333	2439	−·024	329	2515	−·022	February.	**16**	324	2595	..
330	345	2249	...	340	2318	−·020	335	2395	−·023	331	2468	−·021		**17**	326	2547	−·029
331	347	2208	−·018	342	2275	...	337	2350	−·022	333	2422	−·020		**18**	328	2498	−·028
332	349	2167	−·017	344	2232	−·019	339	2306	−·021	335	2375	...		**19**	330	2450	−·027
333	351	2126	−·016	346	2190	−·018	341	2261	−·020	337	2329	−·019		**20**	332	2401	−·026
334	353	2085	...	348	2147	−·017	343	2217	−·019	339	2282	−·018		**21**	334	2353	−·025
335	355	2044	−·015	350	2104	−·016	345	2172	...	341	2236	−·017		**22**	336	2304	−·024
336	355	1976	−·014	350	2034	−·015	345	2100	−·018	341	2161	−·016		**23**	336	2227	−·023
337	356	1908	−·013	351	1964	−·014	346	2027	−·017	342	2087	−·015		**24**	337	2150	−·022
338	356	1840	−·012	351	1894	...	346	1955	−·016	342	2012	−·014		**25**	337	2074	−·021
339	357	1772	...	352	1824	−·013	347	1882	−·015	343	1938	..		**26**	338	1997	...
340	357	1704	−·011	352	1753	−·012	347	1810	...	343	1863	−·013		**27**	338	1920	−·020
341	358	1635	−·010	353	1683	−·011	348	1738	−·014	344	1789	−·012		**28**	339	1843	−·019
342	358	1567	−·009	353	1613	−·010	348	1665	−·013	344	1714	−·011		**1**	339	1766	−·018
343	359	1499	−·008	354	1543	...	349	1593	−·012	345	1640	−·010		**2**	340	1690	−·017
344	359	1431	...	354	1473	−·009	349	1520	−·011	345	1565	−·009		**3**	340	1613	−·016
345	360	1363	−·007	355	1403	−·008	350	1448	−·010	346	1491	...		**4**	341	1536	−·015
346	360	1295	−·006	355	1333	−·007	350	1376	−·009	346	1416	−·008		**5**	341	1459	−·014
347	361	1227	...	356	1263	...	351	1303	...	347	1342	−·007		**6**	342	1382	−·013
348	361	1159	−·005	356	1193	−·006	351	1231	−·008	347	1267	−·006		**7**	342	1306	...
349	362	1091	−·004	357	1123	−·005	352	1158	−·007	348	1193	−·005		**8**	343	1229	−·012
350	362	1023	−·003	357	1052	−·004	352	1086	−·006	348	1118	−·004		**9**	343	1152	−·011
351	363	954	−·002	357	982	−·003	352	1014	−·005	349	1044	−·003		**10**	344	1075	...
352	363	886	...	358	912	−·002	353	941	−·004	349	969	−·002	March.	**11**	344	998	−·010
353	364	818	−·001	358	842	−·001	353	869	..	349	895	−·001		**12**	344	922	..
354	364	750	·000	358	772	...	353	796	−·003	350	820	...		**13**	345	845	−·009
355	365	682	+·001	359	702	·000	354	724	−·002	350	746	·000		**14**	345	768	−·008
356	365	614	+·002	359	632	+·001	354	652	−·001	350	671	+·001		**15**	345	691	−·007
357	366	546	+·003	360	562	+·002	354	579	·000	351	597	...		**16**	346	614	−·006
358	366	478	...	360	492	...	355	507	+·001	351	522	+·002		**17**	346	538	−·005
359	367	410	+·004	360	422	+·003	355	434	...	351	448	+·003		**18**	346	461	−·004
360	367	342	+·005	361	351	+·004	355	362	+·002	352	373	+·004		**19**	347	384	−·003
361	368	273	+·006	361	281	+·005	356	290	+·003	352	299	+·005		**20**	347	307	−·002
362	368	205	+·007	361	211	+·006	356	217	+·004	352	224	+·006		**21**	347	230	−·001
363	368	137	...	362	141	...	356	145	+·005	353	150	+·007		**22**	348	154	·000
364	367	69	+·008	362	71	+·007	357	72	+·006	353	75	...		**23**	348	77	...
365	367	0	...	362	0	+·008	357	0	...	353	0	+·008		**24**	348	0	+·001

TABLE III.—Sunrise from 33° to 35° N. latitude.

	Lat. 33°		Long. −480″ = −·0055 of day.	Lat. 34°		Long. −228″ = −·003 of day.	Lat. 35°		Long. −1592″ = −·0185 of day.	
Day of solar year.	Eqn. of time in seconds.	⊙'s trop. long. in seconds.	Total correctn. as fraction of a day Jehlum. A.D. 1000–1400.	Eqn. of time in seconds.	⊙'s trop. long. in seconds.	Total correctn. as fraction of a day. Srinagar. A.D. 1000–1400.	Eqn. of time in seconds.	⊙'s trop. long. in seconds.	Total correctn. as fraction of a day. Kabul. A.D. 1000–1400.	Eng. date.
1	−343	+79	+ ·001	−338	+82	+ ·003	−333	+84	− ·012	March 25
2	341	158	+ ·002	336	163	+ ·004	331	168	− ·011	26
3	340	238	+ ·003	335	245	+ ·005	330	252	− ·010	27
4	339	317	+ ·004	334	326	+ ·006	329	336	− ·009	28
5	337	396	+ ·005	332	408	+ ·007	328	420	− ·008	29
6	336	475	+ ·006	331	490	+ ·008	327	504	− ·007	30
7	334	554	+ ·007	330	571	+ ·009	325	588	− ·006	31
8	332	634	+ ·008	328	653	+ ·010	323	672	− ·005	1
9	330	713	+ ·009	326	734	+ ·011	321	756	− ·004	2
10	328	792	...	324	816	+ ·012	319	840	− ·003	3
11	326	871	+ ·010	321	898	+ ·013	317	924	− ·002	4
12	324	950	+ ·011	319	979	+ ·014	315	1008	− ·001	5
13	322	1030	+ ·012	317	1061	...	313	1092	·000	6
14	319	1109	+ ·013	315	1142	+ ·015	310	1176	+ ·001	7
15	316	1188	+ ·014	312	1224	+ ·016	308	1260	+ ·002	8
16	314	1267	+ ·015	310	1306	+ ·017	306	1344	+ ·003	9
17	312	1346	+ ·016	308	1387	+ ·018	304	1428	+ ·004	10
18	310	1426	+ ·017	306	1469	+ ·019	302	1512	+ ·005	11
19	308	1505	+ ·018	304	1550	+ ·020	300	1596	+ ·006	12
20	306	1584	...	302	1632	+ ·021	298	1680	+ ·007	13
21	304	1663	+ ·019	300	1714	+ ·022	296	1764	+ ·008	April 14
22	302	1742	+ ·020	298	1795	+ ·023	294	1848	...	15
23	300	1822	...	296	1877	...	292	1932	+ ·009	16
24	298	1901	+ ·021	294	1958	+ ·024	290	2016	.	17
25	296	1980	+ ·022	292	2040	+ ·025	288	2100	+ ·010	18
26	294	2059	...	290	2122	...	286	2184	+ ·011	19
27	292	2138	+ ·023	288	2203	+ ·026	284	2268	...	20
28	290	2218	...	286	2285	...	282	2352	+ ·012	21
29	288	2297	+ ·024	284	2366	+ ·027	280	2436	+ ·013	22
30	286	2376	+ ·025	282	2448	+ ·028	278	2520	...	23
31	284	2426	...	280	2500	...	276	2574	+ ·014	24
32	282	2477	+ ·026	278	2552	+ ·029	274	2628	...	25
33	280	2527	.	276	2604	+ ·030	272	2683	+ ·015	26
34	278	2577	+ ·027	274	2655	...	270	2737	+ ·016	27
35	276	2628	+ ·028	272	2707	+ ·031	268	2791	...	28
36	274	2678	...	270	2759	..	266	2845	+ ·017	29
37	272	2728	+ ·029	268	2811	+ ·032	264	2899	+ ·018	30
38	270	2779	..	266	2863	...	262	2953	...	1
39	269	2829	+ ·030	264	2915	+ ·033	260	3008	+ ·019	2
40	264	2879	+ ·031	261	2967	+ ·034	258	3062	+ ·020	3
41	260	2929	+ ·032	258	3019	+ ·035	256	3116	+ ·021	4
42	254	2980	...	252	3070	...	250	3170	...	5
43	247	3030	+ ·033	245	3122	+ ·036	243	3224	+ ·022	6
44	242	3080	...	240	3174	+ ·037	237	3279	+ ·023	7
45	236	3131	+ ·034	234	3226	...	231	3333	...	8
46	231	3181	...	228	3278	+ ·038	226	3387	+ ·024	9
47	224	3231	+ ·035	222	3330	...	219	3441	...	10
48	218	3282	+ ·036	216	3382	+ ·039	213	3495	+ ·025	May 11
49	212	3332	+ ·037	210	3433	+ ·040	208	3550	+ ·026	12
50	207	3382	...	205	3485	+ ·041	203	3604	+ ·027	13
51	201	3433	+ ·038	199	3537	...	197	3658	+ ·028	14
52	195	3483	...	193	3589	+ ·042	191	3712	...	15
53	188	3533	...	186	3641	...	184	3766	+ ·029	16
54	182	3584	...	180	3693	..	178	3821	...	17
55	176	3634	...	177	3745	...	176	3875	...	18
56	172	3684	...	174	3797	...	172	3929	.	19
57	169	3735	...	171	3848	...	168	3983	...	20
58	166	3785	...	168	3900	...	164	4037	...	21
59	163	3835	...	165	3952	...	160	4092	...	22
60	160	3886	...	162	4004	...	156	4146	...	23
61	157	3936	...	159	4056	...	152	4200	...	24
62	154	3989	+ ·039	156	4060	+ ·043	148	4205	...	25

TABLE III.—Sunrise from 33° to 35° N. latitude—*cont.*

Day of solar year.	Lat. 33° Eqn. of time in seconds	Lat. 33° ☉'s trop. long. in seconds	Long. −480″ = −·0055 of day. Total correctn as fraction of a day. **Jehlum.** A.D. 1000–1400	Lat. 34° Eqn. of time in seconds.	Lat. 34° ☉'s trop long. in seconds.	Long. −228″ = −·003 of day. Total correctn. as fraction of a day. **Srinagar.** A.D. −1000 1400.	Lat. 35° Eqn. of time in seconds.	Lat. 35° ☉'s trop long. in seconds.	Long. −1592″ = −·0185 of day. Total correctn. as fraction of a day. **Kabul.** A.D. −1000 1400.	Eng. date
63	−151	+3942	+ ·039	−153	+4064	+ ·043	−144	+4210	+ ·029	26
64	148	3946	...	150	4068	...	140	4214	...	27
65	138	3949	...	138	4072	...	137	4219	...	28
66	130	3952	...	130	4076	...	130	4224	+ ·030	May 29
67	121	3955	...	120	4080	...	120	4229	..	30
68	112	3958	.	112	4084	...	112	4234	...	31
69	103	3962	...	103	4088	...	103	4238	...	1
70	95	3965	...	94	4092	...	94	4243	...	2
71	86	3968	+ ·040	85	4096	..	85	4248	..	3
72	77	3971	...	76	4100	...	76	4253	...	4
73	68	3974	...	68	4104	+ .044	68	4258	...	5
74	58	3978	...	58	4108	...	58	4262	...	6
75	51	3981	..	50	4112	...	50	4267	...	7
76	41	3984	+ ·041	41	4116	...	41	4272	+ ·031	8
77	32	3987	...	32	4120	...	32	4277	...	9
78	23	3990	...	23	4124	.	23	4282	...	10
79	14	3994	...	14	4128	...	14	4286	...	11
80	5	3997	...	5	4132	+ ·045	5	4291	...	12
81	+ 4	4000	...	+ 4	4136	...	+ 4	4296	...	13
82	13	4003	...	13	4140	...	13	4301	+ ·032	14
83	22	4006	..	22	4144	...	22	4306	...	15
84	30	4010	...	30	4148	+ ·044	30	4310	+ ·031	June 16
85	40	4013	...	40	4152	...	40	4315	...	17
86	49	4016	+ ·040	48	4156	..	48	4320	+ ·030	18
87	57	4019	..	57	4160	+ ·043	57	4325		19
88	67	4022	+ ·039	66	4164	...	66	4330	+ ·029	20
89	76	4026	...	75	4168	+ ·042	75	4334	...	21
90	84	4029	...	84	4172	...	84	4339	...	22
91	110	4032	..	111	4176	...	111	4344	+ ·028	23
92	121	3994	+ ·038	121	4137	...	121	4304	...	24
93	131	3956	...	132	4099	...	132	4265	...	25
94	141	3918	...	141	4060	+ ·041	142	4225	...	26
95	151	3880	+ ·037	151	4021	...	152	4186	+ ·027	27
96	162	3842	...	162	3982	+ ·040	163	4147	...	28
97	172	3804	...	172	3944	...	173	4107	...	29
98	182	3766	+ ·036	182	3905	...	183	4068	+ ·026	30
99	192	3728	..	193	3866	+ ·039	193	4028	..	1
100	202	3691	+ ·035	202	3828	..	203	3989	+ ·025	2
101	211	3653	.	212	3789	...	212	3949	...	3
102	221	3615	...	222	3750	..	222	3910	...	4
103	231	3577	...	232	3711	+ ·038	232	3870	+ ·024	5
104	242	3539	+ ·034	243	3673	...	244	3831	...	6
105	251	3501	...	252	3634	...	253	3791	...	7
106	261	3463	...	262	3595	+ ·037	263	3752	...	8
107	270	3425		271	3557	..	272	3712	...	9
108	278	3387	+ ·033	279	3518	+ ·036	280	3673	+ ·023	10
109	288	3349	...	288	3479	...	289	3633	.	11
110	297	3311	...	297	3440	...	298	3594	+ ·022	12
111	305	3273	+ ·032	305	3402	..	306	3554	...	13
112	315	3235	..	316	3363	+ ·035	316	3515	+ ·021	July 14
113	324	3197	+ ·031	325	3324	..	326	3475	..	15
114	333	3159	...	334	3286	+ ·034	335	3436	+ ·020	16
115	342	3121	+ ·030	343	3247	...	344	3396	..	17
116	350	3084	+ ·029	351	3208	+ ·033	352	3357	+ ·019	18
117	359	3046	...	360	3169	...	361	3317		19
118	367	3008	...	368	3131	+ ·032	369	3278	+ ·018	20
119	375	2970	+ ·028	376	3092	...	377	3238	...	21
120	383	2932	...	384	3053	+ ·031	385	3199	+ ·017	22
121	408	2894	...	411	3015	+ ·030	414	3159	...	23
122	416	2856	+ ·027	419	2976	...	422	3120	+ ·016	24
123	424	2806	+ ·026	427	2924	.	430	3066	...	25
124	432	2755	...	435	2872	+ ·029	438	3011	+ ·015	26
125	439	2705	...	442	2820	...	445	2957	...	27

TABLE III.—Sunrise from 33° to 35° N. latitude—*cont.*

Day of solar year.	Lat. 33° Eqn. of time in seconds.	Lat. 33° ☉'s trop. long. in seconds.	Long. −480″ = −·0055 of day. Total correctn. as fraction of a day. Jehlum. A.D. 1000—1400.	Lat. 34° Eqn. of time in seconds.	Lat. 34° ☉'s trop long. in seconds.	Long. −228″ = −·003 of day. Total correctn. as fraction of a day. Srinagar. A.D. 1000—1400	Lat. 35° Eqn. of time in seconds.	Lat. 35° ☉'s trop. long. in seconds.	Long. −1592″ = −·0185 of day. Total correctn. as fraction of a day. Kabul. A.D. 1000—1400.	Eng. date.
126	+447	+2654	+ ·025	+450	+2768	+ ·028	+453	+2902	+ ·014	July 28
127	455	2604	...	458	2716	...	461	2848	+ ·013	29
128	462	2554	+ ·024	465	2664	+ ·027	468	2794	...	30
129	469	2503	+ ·023	472	2612	...	475	2739	...	31
130	476	2453	+ ·022	479	2560	+ ·026	482	2685	+ ·012	August 1
131	483	2402	...	486	2508	..	489	2630	+ ·011	2
132	490	2352	+ ·021	493	2456	+ ·025	496	2576	+ ·010	3
133	497	2302	...	500	2404	..	503	2522	...	4
134	503	2251	+ ·020	506	2352	+ ·024	509	2467	+ ·009	5
135	509	2201	+ ·019	512	2300	+ ·023	515	2413	...	6
136	515	2150	...	518	2248	...	521	2358	...	7
137	521	2100	+ ·018	524	2196	...	527	2304	+ ·008	8
138	527	2050	...	530	2144	+ ·022	533	2250	+ ·007	9
139	533	1999	...	536	2092	+ ·021	539	2195	...	10
140	538	1949	...	541	2040	...	544	2141	+ ·006	11
141	544	1898	+ ·017	547	1988	+ ·020	550	2086	...	12
142	549	1848	...	552	1936	...	555	2032	+ ·005	13
143	554	1798	+ ·016	557	1884	+ ·019	560	1978	...	14
144	559	1747	...	562	1832	...	565	1923	+ ·004	15
145	564	1697	+ ·015	567	1780	...	570	1869	...	16
146	569	1646	...	573	1728	+ ·018	576	1814	+ ·003	17
147	574	1596	+ ·014	580	1676	+ ·017	585	1760	...	18
148	578	1546	...	586	1624	...	591	1706	+ ·002	19
149	580	1495	+ ·013	592	1572	+ ·016	596	1651	...	20
150	582	1445	...	595	1520	...	601	1597	+ ·001	21
151	584	1394	+ ·012	596	1468	+ ·015	602	1542	+ ·000	22
152	586	1344	. .	597	1416	...	603	1488	...	23
153	588	1301	...	598	1370	+ ·014	604	1440	− ·001	24
154	590	1257	+ ·011	599	1325	...	605	1392	...	25
155	592	1214	...	600	1279	+ ·013	606	1344	...	26
156	594	1171	+ ·010	601	1233	...	607	1296	− ·002	27
157	596	1127	...	602	1188	+ ·012	608	1248	..	28
158	599	1084	+ ·009	604	1142	...	609	1200	− ·003	29
159	601	1040	...	606	1096	...	610	1152	...	30
160	603	997	...	608	1051	+ ·011	612	1104	− ·004	31
161	605	954	+ ·008	610	1005	..	614	1056	− ·005	September 1
162	606	910	...	611	959	+ ·010	615	1008	...	2
163	608	867	+ ·007	613	913	...	617	960	− ·006	3
164	610	824	...	615	868	+ ·009	619	912	...	4
165	611	780	+ ·006	616	822	...	620	864	...	5
166	611	737	...	616	776	+ ·008	620	816	− ·007	6
167	612	694	+ ·005	617	731	+ ·007	621	768	...	7
168	613	650	...	618	685	...	622	720	− ·008	8
169	614	607	+ ·004	619	639	+ ·006	623	672	− ·009	9
170	614	564	...	619	594	...	623	624	...	10
171	614	520	+ ·003	619	548	+ ·005	623	576	− ·010	11
172	614	477	...	619	502	...	623	528	...	12
173	614	433	+ ·002	619	457	+ ·004	623	480	− ·011	13
174	614	390	...	619	411	...	623	432	...	14
175	614	347	+ ·001	619	365	+ ·003	623	384	− ·012	15
176	614	303	...	619	320	...	623	336	− ·013	16
177	613	260	·000	618	274	+ ·002	622	288	...	17
178	612	217	...	617	228	...	621	240	− ·014	18
179	611	173	− ·001	616	183	+ ·001	620	192	...	19
180	610	130	...	615	137	·000	619	144	− ·015	20
181	608	87	− ·002	613	91	...	617	96	...	21
182	607	43	...	612	46	− ·001	616	48	− ·016	22
183	607	0	− ·003	612	0	...	616	0	− ·017	23
184	606	−45	...	611	−47	− ·002	616	−50	...	24
185	604	90	− ·004	609	94	...	614	99	− ·018	25
186	602	134	...	607	142	− ·003	612	149	...	26

TABLE III.—Sunrise from 33° to 35° N. latitude—*cont.*

	Lat. 33°		Long. −480″ = −·0055 of day.	**Lat. 34°**		Long. −228″ = −008 of day.	**Lat. 35°**		Long. −1592″ = −·0185 of day		
Day of solar year.	Eqn. of time in seconds.	☉'s trop. long in seconds.	Toatl correctn. as fraction of a day. **Jehlum.** **A.D.** 1000—1400.	Eqn. of time in seconds.	☉'s trop. long. in seconds.	Total correctn. as fraction of a day. **Srinagar.** **A.D.** 1000—1400.	Eqn. of time in seconds.	☉'s trop. long in seconds.	Total correctn as fraction of a day. **Kabul** **A.D.** 1000—1400.		**Eng. date.**
187	+600	−179	−·005	+605	−189	−008	+610	−198	−·019		**27**
188	597	224	...	602	236	−·004	607	248	...		**28**
189	604	269	−·006	609	288	..	614	298	−·020	Sep	**29**
190	601	314	...	606	330	−·005	611	347	−·021		**30**
191	588	358	−·007	593	378	−·006	598	397	−022		**1**
192	585	403	−·008	590	425	...	595	446	..		**2**
193	581	448	.	586	472	−·007	591	496	−·023		**3**
194	578	493	−·009	583	519	...	588	546	...		**4**
195	574	538	...	579	566	−·008	584	595	−·024		**5**
196	570	582	−·010	575	614	...	580	645	..		**6**
197	566	627	−011	571	661	−·009	576	694	−·025		**7**
198	562	672	...	567	708	...	572	744	−·026		**8**
199	558	717	−·012	563	755	−·010	568	794	..		**9**
200	553	762	...	558	802	...	563	848	−·027		**10**
201	548	806	−·013	553	850	−·011	558	893	−·028		**11**
202	544	851	..	549	897	−·012	558	942	...		**12**
203	539	896	−·014	544	944	...	549	992	−·029		**13**
204	533	941	...	538	991	−013	543	1042	−·030		**14**
205	528	986	−·015	533	1088	−·014	588	1091	..		**15**
206	523	1030	−·016	528	1086	...	583	1141	−031		**16**
207	519	1075	...	524	1138	−015	529	1191	−082		**17**
208	518	1120	−·017	518	1180	−016	528	1240	−·088		**18**
209	507	1165	−·018	512	1227	−·017	517	1290			**19**
210	501	1210	...	506	1274	...	511	1339	−·084		**20**
211	495	1254	−·019	500	1322	−·018	505	1389	−035		**21**
212	488	1299	−·020	493	1369	−·019	498	1438	..	October.	**22**
213	484	1344	−·021	487	1416	...	490	1488	−·086		**23**
214	477	1394	..	480	1468	−·020	483	1542	..		**24**
215	470	1445	−·022	473	1520	−·021	476	1597	−·087		**25**
216	468	1495	...	466	1572	−·022	469	1651	−038		**26**
217	456	1546	−·023	459	1624	...	462	1706	...		**27**
218	449	1596	...	452	1676	−·028	455	1760	−·089		**28**
219	441	1646	−·024	444	1728	...	447	1814	−·040		**29**
220	434	1697	−·025	487	1780	−·024	440	1869			**30**
221	426	1747	−·026	429	1832	−·025	432	1923	−·041		**31**
222	418	1798	...	421	1884	−·026	424	1978	...		**1**
223	410	1848	−·027	413	1936	...	416	2082	−·042		**2**
224	402	1898	−028	405	1988	−·027	408	2086	−·048		**3**
225	394	1949	...	897	2040	−·028	400	2141	−·044		**4**
226	386	1999	−·029	389	2092	−·029	392	2195	−·045		**5**
227	377	2050	−080	380	2144	...	383	2250	−·046		**6**
228	369	2100	...	372	2196	−·080	375	2304	−·047		**7**
229	360	2150	−·031	863	2248	..	366	2358	...		**8**
230	851	2201	−·032	354	2300	−·081	357	2413	−·048		**9**
231	842	2251	−·083	345	2352	−·032	348	2467	−·049	November	**10**
232	333	2302	...	836	2404	−·033	339	2522	−050		**11**
233	324	2352	−·034	327	2456	...	830	2576			**12**
234	314	2402	−035	317	2508	−·034	320	2680	−·051		**13**
235	305	2453	...	308	2560	−·035	311	2685	−·052		**14**
236	296	2503	−·036	299	2612	...	302	2739	...		**15**
237	287	2554	..	290	2664	..	298	2794	−·053		**16**
238	277	2604	−·037	280	2716	−·036	288	2848			**17**
239	267	2654	...	270	2768	−037	273	2902	−·054		**18**
240	258	2706	−·038	261	2820	..	264	2957	−055		**19**
241	246	2755	...	248	2872	−·038	251	3011	..		**20**
242	236	2806	−·039	238	2924	−·039	241	3066	−·056		**21**
243	211	2856	−·040	212	2976	...	213	3120	...		**22**
244	202	2894	...	208	3015	−·040	204	3159	−057		**23**
245	192	2932	−·041	198	3053	...	194	3199	..		**24**
246	182	2970	...	183	3092	−·041	184	3238	−·058		**25**

TABLE III.—Sunrise from 33° to 35° N. latitude—cont.

Day of solar year.	Lat. 33° Eqn. of time in seconds.	Lat. 33° $\odot$'s trop. long. in seconds.	Long. −480″ = −·0055 of day. Total correctn. as fraction of a day. Jehlum. A.D. 1000—1400.	Lat. 34° Eqn. of time in seconds.	Lat. 34° $\odot$'s trop. long. in seconds.	Long. −228″ = −·008 of day. Total correctn. as fraction of a day. Srinagar. A.D. 1000—1400.	Lat. 35° Eqn. of time in seconds.	Lat. 35° $\odot$'s trop. long. in seconds.	Long. −1592″ = −·0185 of day. Total correctn. as fraction of a day. Kabul. A.D. 1000—1400.	Eng. date.
247	+172	−3008	− 042	+173	−3181	−·041	+174	−3278	−·059	Nov. **26**
248	162	3046	.	163	3169	−·042	164	3317	...	**27**
249	152	3084	−·043	153	3208	...	154	3357	−·060	**28**
250	142	3121	−·044	143	3247	−·043	144	3396	−·061	**29**
251	132	3159	...	133	3286	−·044	134	3436	...	**30**
252	122	3197	−·045	123	3324	...	124	3475	−·062	December. **1**
253	112	3235	...	113	3363	−·045	114	3515	...	**2**
254	102	3273	−·046	103	3402	...	104	3554	...	**3**
255	92	3311	...	93	3440	−·046	94	3594	−·063	**4**
256	82	3349	−·047	83	3479	...	84	3633	−·064	**5**
257	72	3387	...	73	3518	−·047	74	3673	...	**6**
258	62	3425	−·048	63	3557	..	64	3712	−·065	**7**
259	51	3463	−·049	52	3595	−·048	53	3752	−·066	**8**
260	41	3501	...	42	3634	−·049	43	3791	...	**9**
261	31	3539	−·050	32	3673	...	33	3831	−·067	**10**
262	21	3577	...	22	3711	−·050	23	3870	...	**11**
263	11	3615	−·051	12	3750	−·051	13	3910	−·068	**12**
264	− 19	3653	...	− 20	3789	...	− 21	3949	−·069	**13**
265	29	3691	...	30	3828	−·052	31	3989	...	**14**
266	39	3728	.	40	3866	...	41	4028	.	**15**
267	49	3766	−·052	50	3905	...	51	4068	..	**16**
268	59	3804	.	60	3944	...	61	4107		**17**
269	70	3842	..	71	3982	...	72	4147	..	**18**
270	80	3880	...	81	4021	..	82	4186	...	**19**
271	91	3918	...	92	4060	...	93	4225	...	**20**
272	92	3956	..	93	4099	...	94	4265	...	**21**
273	93	3994	...	94	4137	...	95	4304	...	**22**
274	98	4032	−·053	97	4176	...	97	4344	...	**23**
275	103	4029	...	102	4172	...	102	4339	...	**24**
276	109	4026	...	108	4168	...	107	4334	.	**25**
277	115	4022	...	114	4164	..	113	4330	...	**26**
278	120	4019	...	119	4160	.	119	4325	.	**27**
279	126	4016	..	125	4156	.	124	4320	...	**28**
280	132	4013	...	131	4152	...	131	4315	..	**29**
281	137	4010	...	136	4148	.	136	4310	...	**30**
282	143	4006	.	142	4144	.	141	4306	...	**31**
283	149	4003	...	148	4140		146	4301	...	January. **1**
284	154	4000	...	153	4136	...	152	4296	...	**2**
285	160	3997	...	159	4132	..	158	4291	...	**3**
286	166	3994		165	4128	...	163	4286	...	**4**
287	171	3990	...	170	4124	...	168	4282	...	**5**
288	177	3987	..	176	4120	..	174	4277	...	**6**
289	183	3984		182	4116	...	180	4272	...	**7**
290	188	3981	..	187	4112	...	185	4267	...	**8**
291	194	3978	...	193	4108	...	191	4262	...	**9**
292	200	3974	.	199	4104	...	197	4258	...	**10**
293	205	3971	...	204	4100	...	202	4253	...	**11**
294	211	3968	...	210	4096	...	207	4248	...	**12**
295	216	3965	..	216	4092		213	4242	−·069	**13**
296	222	3962	−·052	221	4088	.	219	4238	...	**14**
297	228	3958	..	227	4084	−·051	224	4234	−·068	**15**
298	233	3955	−·051	233	4080	−·050	229	4229	−·067	**16**
299	239	3952	−·050	238	4076	...	235	4224	..	**17**
300	245	3949		244	4072	−·049	241	4219	−·066	**18**
301	250	3946	−·049	249	4068	−,048	246	4214	−·065	**19**
302	256	3942	...	254	4064	−·047	251	4210	...	**20**
303	262	3939	...	259	4060	...	256	4205	...	**21**
304	267	3936	−·048	264	4056	..	261	4200	−·064	**22**
305	269	3886	− 047	266	4004	.	263	4146	−·063	**23**

TABLE III.—Sunrise from 33° to 35° N. latitude—*cont.*

Day of solar year.	**Lat. 33°** Eqn. of time in seconds.	☉'s trop. long. in seconds	Long. −480″ = −·0055 of day. Total correctn as fraction of a day. **Jehlum.** A.D. 1000—1400.	**Lat. 34°** Eqn. of time in seconds.	☉'s trop. long. in seconds.	Long. −228″ = −·003 of day. Total correctn as fraction of a day. **Srinagar.** A.D. 1000—1400.	**Lat. 35″** Eqn. of time in seconds.	☉'s trop. long. in seconds.	Long. −1592″ = −·0185 of day. Total correctn. as fraction of a day. **Kabul.** A.D. 1000—1400.	Month	Eng. date.
306	−271	−3835	−·047	−268	−3952	− 046	−265	−4092	−·063		**24**
307	278	3785	−·046	270	3900	− 045	267	4037	−·062		**25**
308	275	8735	..	272	3848	..	269	3983	−·061		**26**
309	277	3684	−·045	274	3797	−·044	271	3929	..	January.	**27**
310	280	3634	...	277	3745	..	273	3875	−·060		**28**
311	282	3584	− 044	279	3698	− 043	275	3821	..		**29**
312	284	3533	−·043	281	3641	−·042	277	3766	−·059		**30**
313	286	3483	...	283	3589	..	279	3712	−·058		**31**
314	288	3433	−·042	285	3537	− 041	281	3658	..		**1**
315	290	3382	...	287	3485		288	3604	−·057		**2**
316	293	3332	−·041	289	3433	−·040	285	3550	−·056		**3**
317	295	3282	..	291	3382	..	287	3495	...		**4**
318	297	3231	−·040	293	3330	−·039	289	3441	− 055		**5**
319	299	3181	...	295	3278	.	291	3387	...		**6**
320	301	3131	−·039	297	3226	−·038	293	3333	− 054		**7**
321	303	3080		299	3174	−·037	295	3279	− 053		**8**
322	306	3030	− 038	301	3122	...	297	3224	...		**9**
323	308	2980	−·037	303	3070	−·036	299	3170	−·052		**10**
324	310	2929	...	305	3019	..	301	3116	..		**11**
325	312	2879	− 036	307	2967	−·035	303	3062	−·051		**12**
326	314	2829	− 035	309	2915	− 034	305	3008	−·050		**13**
327	316	2779	− 034	311	2863	−·033	307	2953	−·049		**14**
328	318	2728	−·033	313	2811	− 032	309	2899	−·048	February.	**15**
329	320	2678	−·032	315	2759	−·031	311	2845	−·047		**16**
330	322	2628	− 031	317	2707	−·030	313	2791	−·046		**17**
331	324	2577	−·030	319	2655	− 029	315	2737	−·045		**18**
332	326	2527	−·029	321	2604	−·028	317	2683	−·044		**19**
333	328	2477	..	323	2552	−·027	319	2628	−·043		**20**
334	330	2426	−·028	325	2500	−·026	321	2574	−·042		**21**
335	332	2376	−·027	327	2448	−·025	323	2520	−·041		**22**
336	332	2297	−·026	327	2366	− 024	323	2436	− 040		**23**
337	332	2218	−·025	327	2285	−·023	323	2352	−·039		**24**
338	333	2138	−·024	328	2203	−·022	324	2268	−·038		**25**
339	333	2059	− 023	328	2122	−·021	324	2184	−·037		**26**
340	333	1980	−·022	328	2040	−·020	324	2100	−·036		**27**
341	334	1901	− 021	329	1958	−·019	325	2016	− 035		**28**
342	334	1822	− 020	329	1877	− 018	325	1932	−·034		**1**
343	334	1742	−·019	329	1795	...	325	1848	−·033		**2**
344	335	1663	− 018	330	1714	−·017	326	1764	−·032		**3**
345	335	1584	−·017	330	1632	− 016	326	1680	−·031		**4**
346	335	1505	− 016	330	1550	− 015	326	1596	−·030		**5**
347	336	1426	.	331	1469	−·014	327	1512	− 029		**6**
348	336	1346	−·015	331	1387	− 013	327	1423			**7**
349	336	1267	−·014	331	1306	− 012	327	1344	−·028		**8**
350	337	1188	−·013	332	1224	−·011	328	1260	− 027		**9**
351	337	1109	−·012	332	1142	− 010	328	1176	− 026		**10**
352	337	1030	−·011	332	1061	−·009	328	1092	− 025		**11**
353	338	950	−·010	333	979	−·008	329	1008	− 024		**12**
354	338	871	−·009	333	898	− 007	329	924	−·023		**13**
355	338	792	...	333	816	...	329	840	−·022		**14**
356	339	713	−·008	334	734	−·006	330	756	−·021		**15**
357	339	634	−·007	334	653	− 005	330	672	−·020		**16**
358	339	554	−·006	334	571	−·004	330	588	−·019	March.	**17**
359	340	475	−·005	335	490	−·003	331	504	− 018		**18**
360	340	396	−·004	335	408	−·002	331	420	− 017		**19**
361	340	317	−·003	335	326	−·001	331	336	−·016		**20**
362	341	238	−·002	336	245	− 000	332	252	− 015		**21**
363	341	158	− 001	336	163	..	332	168	−·014		**22**
364	341	79	.	336	82	+ ·001	332	84	−·013		**23**
365	342	0	000	337	0	+ ·002	333	0	−·012		**24**

TABLE III-A Latitudes and Longitudes of chief places in British India and the Feudatory States.

(Longitudes are expressed by the difference in seconds of time as compared with Ujjain.)

BRITISH TERRITORY.

Serial No.	District.	Town.	Latitude in degrees and decimals of a degree.	Time difference in seconds.
	Aden Province.			
1	Aden	Aden	12·7	−7848
	Ajmere-Merwara Province.			
2	Ajmere	Ajmere	26·5	− 280
		Nazirabad	26·3	− 256
3	Merwara	Beawar (Nayanagar).	26·0	− 352
	Baluchistan Province.			
4	Quetta—Peshin	Quetta	30·2	−2104
	Bengal Province.			
5	Balasore	Balasore	21·5	+2676
6	Bankura	Bankura	23·2	+2708
7	Bhagalpur	Bhagalpur	25·2	+2692
8	Burdwan	Burdwan	23·2	+2896
		Howrah	22·5	+3016
9	Champaram	Bettiah	26·5	+2092
10	Cuttack	Cuttack	20·5	+2420
11	Darbhanga	Darbhanga	26·2	+2428
12	Gaya	Gaya	24·5	+2216
13	Hooghly	Hoogly and Chinsura.	23·0	+3028
		Serampore	22·7	+3016
14	Midnapore	Midnapore	22·5	+2768
15	Monghyr	Monghyr	25·3	+2564
16	Murshidabad	Berhampore	24·0	+2996
17	Muzaffarpur	Hajipur	25·7	+2260
		Muzaffarpur	26·0	+2308
18	Nadia	Krishnagar	23·5	+3056
		Santipur	23·2	+3040
19	Twenty-four Parganas.	Calcutta, Cossipur-Chitpur, Garden Reach, Maniktala	22·5	+3020
		Naihati	23·0	+3032
		Baranagar	22·7	+3020
		Bhatpara	23·0	+3032
20	Patna	Patna	25·7	+2252
		Bihar	25·2	+2336
		Dinapore	25·7	+2224
21	Puri	Puri	19·8	+2408
22	Ranchi	Ranchi	23·3	+2292
23	Saran	Chapra	25·8	+2148
24	Shahabad	Sasaram	25·0	+1976
		Arrah	25·5	+2132
	Berar Province.			
25	Akola	Akola	20·7	+ 300
26	Amraoti	Amraoti	21·0	+ 480
27	Ellichpur	Ellichpur	21·2	+ 424
	Bombay Province.			
28	Ahmadabad	Ahmadabad	23·0	− 768
29	Ahmadnagar	Ahmadnagar	19·0	− 208
30	Belgaum	Belgaum	16·0	− 304
31	Bijapur	Bijapur	16·8	− 16
32	Bombay	Bombay	19·0	− 692
33	Broach	Broach	21·7	− 672
34	Dharwar	Hubli	15·3	− 152
		Dharwar	15·5	− 184
		Gadag	15·5	− 36
35	Kaira	Nadiad	22·7	− 700
36	Khandesh	Dhulia	21·0	− 240
	Bombay Province—cont.			
37	Nasik	Nasik	20·0	− 480
38	Panch Mahal	Godhra	22·7	− 520
39	Poona	Poona	18·5	− 464
40	Sholapur	Sholapur	17·7	+ 28
		Pandharpur	17·7	− 84
		Barsi	18·2	− 24
41	Satara	Satara	17·7	− 428
42	Surat	Surat	12·2	− 708
43	Thana	Bandra	19·0	− 708
	Burma Province.			
44	Akyab	Akyab	20·2	+ 4112
45	Amherst	Moulmein	16·5	+ 5244
46	Bassein	Bassein	16·7	+ 4556
47	Henzada	Henzada	17·7	+ 4732
48	Mandalay	Mandalay	22·0	+ 4876
49	Prome	Prome	18·8	+ 4664
50	Rangoon	Rangoon	16·7	+ 4896
51	Tavoy	Tavoy	14·1	+ 5380
	Central Provinces.			
52	Jubbalpore	Jubbalpore	23·2	+ 1000
53	Nagpur	Kamptee	21·2	+ 820
		Nagpur	21·2	+ 800
54	Nimar	Burhanpur	21·3	+ 108
55	Raipur	Raipur	21·2	+ 1408
56	Saugor	Saugor	23·8	+ 712
	Eastern Bengal and Assam Province.			
57	Chittagong	Chittagong	23·3	+ 3852
58	Dacca	Dacca, Narayanganj	23·7	+ 3508
59	Manipur	Imphal	24·8	+ 4360
60	Pabna	Sirajganj	24·5	+ 3352
61	Rajshahi	Rampur-Bolia	24·3	+ 3076
	Madras Province.			
62	Bellary	Adoni	15·7	+ 360
		Bellary	15·2	+ 256
63	Chingleput	Conjeeveram	12·8	+ 940
64	Coimbatore	Coimbatore	11·0	+ 284
65	Ganjām	Berhampur	19·3	+ 2164
66	Gōdāvari	Cocanada	17·0	+ 1548
		Rajahmundry	17·0	+ 1436
67	Kistna	Bezwada	16·5	+ 1160
		Ellore	16·7	+ 1280
		Masulipatam	16·2	+ 1284
68	Guntūr	Guntūr	16·3	+ 1124
69	Kurnool	Kurnool	15·8	+ 548
70	Madras	Madras	13·0	+ 1072
71	Madura	Madura	10·0	+ 560
		Bodinayakkanur	10·0	+ 376
		Dindigul	10·3	+ 528
72	Malabar	Calicut	11·2	+ 0
		Cannanore	11·8	− 100
		Palghat	10·8	+ 208
		Tellicherry	11·7	− 72
73	Nellore	Nellore	14·5	+ 1008
74	North Arcot	Gudiyāttam	13·0	+ 744
		Vellore	12·9	+ 808
75	Salem	Salem	11·7	+ 572
76	South Arcot	Cuddalore	11·7	+ 956
77	South Kanara	Mangalore	12·8	− 224
78	Tanjore	Kumbakōnam	11·0	+ 860
		Negapatam	10·7	+ 976

TABLE III-A.—Latitudes and longitudes of chief places in British India and the Feudatory States—*cont*.

(Longitudes are expressed by the difference in seconds of time as compared with Ujjain.)

Serial No.	District.	Town.	Latitude in degrees and decimals of a degree.	Time difference in seconds.
	Madras Province—*cont*.			
78	Tanjore—*cont*.	Tanjore	10·7	+ 804
		Mannargudi	10·7	+ 880
		Māyavaram	11·1	+ 928
79	Tinnevelly	Palamcottah	8·7	+ 472
		Rajapalaiyam	9·5	+ 424
		Srivillipnttur	9·5	+ 440
		Tinnevelly	8·7	+ 456
		Tiruchendur	8·5	+ 560
		Tuticorin	8·8	+ 568
80	Trichinopoly	Trichinopoly, Srirangam	10·8	+ 700
81	Vizagapatam	Vizagapatam	17·7	+1804
		Vizianagaram	18·2	+1832
	North-West Frontier Province.			
82	Dera Ismail Khan	Dera Ismail Khan	31·8	−1168
83	Kohat	Kohat	33·6	−1044
84	Peshawar	Peshawar	34·0	−1008
	Punjab Province			
85	Amritsar	Amritsar	31·7	− 216
86	Delhi	Delhi	28·7	+ 352
87	Dera Ghazi Khan	Dera Ghazi Khan	30·0	−1200
88	Ferozepore	Ferozepur	31·0	− 280
89	Gurdaspur	Batala	30·8	− 140
90	Gujranwala	Gujranwala	32·2	− 384
91	Gurgaon	Rewari	28·2	+ 204
92	Hissar	Bhiwani	28·8	+ 84
93	Jhang	Jhang-Maghiana	31·3	− 828
94	Karnal	Karnal	29·7	+ 288
		Panipat	29·4	
95	Jullundur	Jullundur	31·3	− 48
96	Lahore	Lahore	31·6	− 348
		Kasur	31·1	− 316
97	Ludhiana	Ludhiana	31·0	+ 20
98	Multan	Multan	30·2	−1024
99	Rawalpandi	Rawalpandi	33·6	− 640
100	Rohtak	Rohtak	28·9	+ 192
101	Sialkot	Sialkot	32·5	− 300
	Sindh Province.			
102	Hyderabad	Hyderabad	25·3	−1768
103	Karachi	Karachi	24·8	−2092
104	Sukkur	Shikarpur	28·0	−1708
		Sukkur	27·7	−1652
	United Provinces of Agra and Oudh.			
105	Harodi	Shahabad	27·7	+1000
106	Sitapur	Sitapur	27·6	+1172
	NATIVE STATES.			
	Baroda State.			
107	Baroda	Baroda	22·3	− 608
108	Kadi	Patan (Anhilwad)	23·8	− 868
109	Navasan	Navasau	21·0	− 684
	Bombay Native States.			
110	Cambay	Cambay	22·3	− 748
111	Cutch	Bhuj	23·2	−1436
112	Kathiawar	Bhaunagar	21·7	− 860
		Dhoraji	21·7	−1240
	Bombay Native States—*cont*.			
112	Kathiawar—*cont*	Junagarah	21·5	−1244
		Navanagar	22·4	−1824
		Porabandar	21·6	−1436
		Rajkot	22·3	−1188
		Wadhwan	22·6	− 972
113	Kolhapur	Kolhapur	16·6	− 364
	Central India Agency.			
114	Rewah	Rewah	24·5	+1324
115	Bhopal	Bhopal	23·2	+ 392
116	Datia	Datia	25·6	+ 644
117	Gwalior	Lashkar	26·2	+ 572
		Ujjain	23·1	+ 0
118	Indore	Indore	22·7	+ 28
119	Iaora	Iaora	23·6	− 156
120	Mandasar in Gwalior.	Mandasar	24·1	− 168
121	Ratlam	Ratlam	23·3	− 176
	Hyderabad State.			
122	Aurangabad	Aurangabad, Jalna	19·8	− 108
123	Gulbarga	Gulbarga	17·3	+ 256
124	Hyderabad	Hyderabad	17·3	+ 640
125	Raichur	Raichur	16·2	+ 376
	Kashmir State.			
126	Jammu	Jammu	32·7	− 208
127	Kashmir	Srinagar	34·8	− 228
	Madras Native States.			
128	Cochin	Ernakulam	10·0	+ 120
		Mattancheri	10·0	+ 112
129	Pudukkottai	Pudukkottai	10·3	+ 728
130	Travancore	Alleppey	9·5	+ 132
		Nagercoil	8·1	+ 400
		Trivandrum	8·5	+ 280
	Mysore State.			
131	Bangalore	Bangalore	13·0	+ 432
132	Kolar	Kolar	13·1	+ 564
133	Mysore	Mysore	12·3	+ 212
	Punjab Native States.			
134	Malar Kotla	Malar Kotla	30·5	+ 48
135	Patiala	Patiala	30·3	+ 164
	Rajputana Agency.			
136	Alwar	Alwar	27·6	+ 196
137	Bharatpur	Bharatpur	27·2	+ 412
138	Bikaner	Bikaner	28·0	− 596
139	Jaipur	Sikar	27·6	− 156
		Jaipur	26·9	+ 12
140	Karauli	Karauli	26·5	+ 300
141	Kotah	Kotah	25·1	+ 16
142	Jodhpur	Jodhpur	26·3	− 664
143	Mewar or Udaipur	Udaipur	24·6	− 500
144	Tonk	Tonk	26·1	+ 4
	United Provinces Native States.			
145	Rampur	Rampur	28·8	+ 780

TABLE IV.—Mars.

Data for calculating latitude and geocentric longitude of Mars from 1 B.C. to A.D. 2000.

Mars' mean motion for Centuries.

A.D.	Kaliyuga.	Mean longitude at commencement of solar year.	Longitude of apsis.	Longitude of node.
		Deg.	Deg.	Deg.
1 B.C.	3101 K.Y.	254·7442	130·0274	40·0866
100 A.D.	3201	315·2712	130·0291	40·0848
200	3301	15·7982	130 0308	40·0830
300	3401	76·3252	130·0325	40 0813
400	3501	136·8522	130 0842	40·0795
500	3601	197·3793	130 0359	40·0777
600	3701	257 9068	130·0376	40·0759
700	3801	318·4333	130 0393	40·0741
800	3901	18·9603	130 0410	40·0723
900	4001	79 4873	130 0127	40·0706
1000 A.D.	4101 K.Y.	140·0144	130·0444	40·068
1100	4201	200·5414	130·0461	40·067
1200	4301	261 0684	130·0478	40·065
1300	4401	321·5954	130·0495	40·063
1400	4501	22·1224	130 0512	40·061
1500	4601	82 6495	130·0529	40·059
1600	4701	143·1765	130·0546	40·0581
1700	4801	203·7035	130·0563	40·056
1800	4901	264·2305	130·0580	40 054
1900	5001	324·7575	130·0597	40 052
2000	5101	25·2846	130 0614	40 051

Mars' mean motion for odd years.

Yrs	Deg.	Yrs.	Deg	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.
1	191·40	**11**	305·46	**21**	59·51	**31**	173·56	**41**	287·62	**51**	41 67	**61**	155·72	**71**	269·77	**81**	23 83	**91**	187·8
2	22·81	**12**	136·86	**22**	250·92	**32**	4·97	**42**	119·02	**52**	233 07	**62**	347 13	**72**	101·18	**82**	215·23	**92**	329·2
3	214·22	**13**	328·27	**23**	82·32	**33**	196·37	**43**	310·48	**53**	64·48	**63**	178 53	**73**	292 58	**83**	46·64	**93**	160 6
4	45 62	**14**	159 67	**24**	273 73	**34**	27·37	**44**	141·83	**54**	255·88	**64**	9 94	**74**	123·99	**84**	238·04	**94**	352 0
5	237·03	**15**	351·08	**25**	105 1	**35**	219 18	**45**	333 24	**55**	87·29	**65**	201·34	**75**	315·39	**85**	69·45	**95**	188·50
6	68·43	**16**	182·48	**26**	296·54	**36**	70 59	**46**	164·64	**56**	278 69	**66**	32 75	**76**	146·80	**86**	260 85	**96**	14 91
7	257·84	**17**	13 89	**27**	127 94	**37**	241·99	**47**	356 05	**57**	110·10	**67**	224·15	**77**	338 21	**87**	92 26	**97**	206 31
8	91·24	**18**	205 29	**28**	319 35	**38**	73·40	**48**	187·45	**58**	301·31	**68**	55 56	**78**	169·61	**88**	283·66	**98**	37·72
9	282 65	**19**	36 70	**29**	150·75	**39**	264 80	**49**	18·86	**59**	132·91	**69**	246 96	**79**	1·02	**89**	115·07	**99**	229 12
10	114 05	**20**	228·10	**30**	342·16	**40**	96·21	**50**	210·26	**60**	324·32	**70**	78·37	**80**	192·42	**90**	306·47	**100**	60·53

Mars' mean motion for days.

Days.	0	1	2	3	4	5	6	7	8	9
					Degrees.					
0	...	0·52	1 05	1·57	2·10	2 62	3·14	3·67	4·19	4·72
1	5·24	5·76	6 29	6 81	7 33	7·86	8 38	8·91	9·43	9·96
2	10·48	11 00	11·52	12·05	12·58	13 10	13·62	14·15	14·67	15·19
3	15·72	16·24	16 77	17·29	17·82	18·34	18·86	19·39	19 91	20 44
4	20·96	21·48	22·01	22 53	23·06	23·58	24 11	24·63	25·15	25·68
5	26·20	26 73	27·25	27·77	28 30	28·82	29·35	29·87	30 39	30 92
6	31·44	31·97	32 49	33·01	33 54	34·07	34·59	35·11	35·63	36·16
7	36 68	37·21	37·73	38·25	38 78	39·30	39·83	40·35	40·87	41·40
8	41·92	42 45	42·97	43·49	44·02	44·54	45·07	45·59	46·11	46·64
9	47·16	47·69	48·21	48·73	49·26	49·78	50 31	50·83	51·35	51 88
10	52·40	52·93	53 45	53·97	54·50	55·02	55·55	56·07	56·59	57·12
11	57·64	58·17	58 70	59 22	59·74	60·26	60·79	61 31	61 84	62·36
12	62 88	63·41	63·93	64 46	64·98	65·50	66·03	66·55	67·08	67 60
13	68·12	68·65	69·17	69·70	70 22	70·74	71 27	71 79	72 32	72·84
14	73·36	73·89	74·41	74·94	75 46	75·98	76·51	77·03	77·56	78 08
15	78·60	79·13	79·65	80·18	80·70	81·22	81·75	82 27	82·80	83 32
16	83·84	84·37	84 89	85·42	85·94	86·46	86·99	87·51	88·04	88·56
17	89·09	89·61	90·13	90·66	91·88	91·71	92·23	92·75	93·28	93·80
18	94·33	94·85	95·37	95·90	96·42	96 95	97 47	97·99	98·52	99·04
19	99·57	100·09	100·61	101·14	101·66	102·19	102 71	103 23	103·76	104 28
20	104·81	105·33	105·85	106 38	106·90	107·43	107·95	108·47	109·00	109·52
21	110·05	110 57	111·09	111 62	112·14	112·67	113 19	113 71	114·24	114 77
22	115·29	115 81	116·33	116 86	117·38	117·91	118·43	118·96	119·46	120·00
23	120·53	121·05	121 58	122 10	122·62	123·15	123·67	124·20	124·72	125·25
24	125·77	126·29	126·82	127·34	127·86	128·39	128·91	129 44	129·96	130 48
25	131·01	131·53	132·06	132 55	133·10	133 63	134·15	134·68	135·20	135 72
26	136 25	136·77	137·30	137·82	138·34	138·87	139·39	139·92	140·44	140 96
27	141·49	142·01	142·54	143·06	143·58	144·11	144·63	145·16	145·68	146·20
28	146 73	147·25	147·78	148·30	148 82	149·35	149·87	150·40	150·92	151·45
29	151·97	152·49	153·02	153·54	154·07	154 59	155 11	155·64	156·16	156·69
30	157·21	157·73	158 26	158 78	159·31	159·83	160 35	160·88	161·40	161·93
31	162·45	162·97	163·50	164·02	164·55	165·07	165·59	166·12	166·64	167 17
32	167·69	168·21	168·74	169·26	169·79	170·31	170·83	171·36	171·88	172·41
33	172·93	173·45	173·98	174 50	175·03	175·55	176·07	176·60	177·12	177 65
34	178 17	178·69	179·22	179·74	180·27	180 79	181·31	181·84	182·36	182·89
35	183 41	183·94	184·46	184·98	185·51	186·03	186·56	187·08	187·60	188·13
36	188·65	189·18	189·70	190·22	190·75	191·27	...	...	...	...

Mars' Annual Eqn. in Deg.

	+	+	−	−
0	0·0	180·0	180 0	360 0
1	2·5	179·5	180·5	357·5
2	5·1	178·9	181·1	354·9
3	7·6	178·4	181·6	352·4
4	10 1	177·8	182 2	349 9
5	12·7	177·3	182 7	347·3
6	15·2	176·8	183 2	344·8
7	17 8	176·2	183 8	342 2
8	20·4	175·7	184·3	339·6
9	23 0	175 1	184·9	337·0
10	25·5	174·5	185·5	334·5
11	28·1	173·9	186·1	331·9
12	30·7	173·4	186 6	329·3
13	33·3	172 8	187·2	326 7
14	35·9	172·2	187·8	324·1
15	38·5	171·5	188 5	321·5
16	41·2	170·9	189·1	318·8
17	43 9	170·3	189·7	316·1
18	46 5	169·6	190·4	313 5
19	49·2	169 0	191 0	310·8
20	51·8	168·3	191·7	308·2
21	54 6	167·5	192·5	305·4
22	57·3	166·8	193·2	302·7
23	60·2	166·0	194·0	299·8
24	63 0	165 3	194·7	297 0
25	65·8	164·5	195·5	294·2
26	68·7	163·6	196·4	291·3
27	71 6	162·6	197·4	288 4
28	74·6	161 7	198·3	285·4
29	77·7	160·7	199·3	282·3
30	80·8	159·6	200·4	279·2
31	84·0	158·5	201·5	276·0
32	87·3	157·3	202·7	272·7
33	90·7	155·9	204·1	269 3
34	94·2	154·5	205·5	265·8
35	97·9	152·8	207·2	262·1
36	101·7	151·0	209·0	258·3
37	106·0	148·7	211·3	254·0
38	110·6	146·2	213·8	249·4
39	116 1	142·7	217·3	243·9
40	124 2	136·5	223·5	235·8
40·15	135·0	...	225·0	...

TABLE IV.—Mars—*cont.*

Mars' anomaly.

Degrees.

+	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	0·0	0·5	0·9	1·4	1·9	2·4	2·9	3·4	3·9	4·4
1	4·8	5·3	5·8	6·3	6·7	7·2	7·7	8·2	8·7	9·2
2	9·7	10·2	10·7	11·2	11·7	12·2	12·7	13·2	13·7	14·2
3	14·7	15·2	15·7	16·2	16·7	17·3	17·8	18·3	18·8	19·4
4	19·9	20·4	20·9	21·4	22·0	22·5	23·0	23·6	24·1	24·7
5	25·2	25·7	26·3	26·9	27·4	28·0	28·6	29·1	29·7	30·2
6	30·8	31·4	32·0	32·6	33·2	33·7	34·4	35·0	35·6	36·2
7	36·9	37·5	38·1	38·7	39·4	40·1	40·7	41·4	42·1	42·7
8	43·4	44·1	44·8	45·5	46·3	47·0	47·7	48·5	49·2	50·0
9	50·8	51·6	52·4	53·2	54·2	55·0	55·9	56·8	57·7	58·7
10	59·7	60·7	61·8	62·9	64·0	65·2	66·5	67·7	69·2	70·6
11	72·2	74·1	76·1	78·4	81·2	85·7	..	...	..	..

Degrees.

−	·0	·1	·2	·3	·4	·5	·6	·7	·8	·
0	180·0	180·5	180·9	181·4	181·9	182·4	182·9	183·4	183·9	18
1	184·8	185·3	185·8	186·3	186·7	187·2	187·7	188·2	188·7	18
2	189·7	190·2	190·7	191·2	191·7	192·2	192·7	193·2	193·7	19
3	194·7	195·2	195·7	196·2	196·7	197·3	197·8	198·3	198·8	19
4	199·9	200·4	200·9	201·4	202·0	202·5	203·0	203·6	204·1	20
5	205·2	205·7	206·3	206·9	207·4	208·0	208·6	209·1	209·7	21
6	210·8	211·4	212·0	212·6	213·2	213·7	214·4	215·0	215·6	21
7	216·9	217·5	218·1	218·7	219·4	220·1	220·7	221·4	222·1	22
8	223·4	224·1	224·8	225·5	226·3	227·9	227·7	229·5	229·2	23
9	230·8	231·6	232·4	233·2	234·2	235·0	235·9	236·8	237·7	23
10	239·7	240·7	241·8	242·9	244·0	245·2	246·5	247·7	249·2	25
11	352·2	254·1	256·1	258·4	261·2	265·7	...	..	...	.

Maximum equation 11·53 for anomaly of 90·00.

Maximum equation 11·53 for anomaly of 270·00.

Degrees.

+	·9	·8	·7	·6	·5	·4	·3	·2	·1	·0
11	...	..	..	...	94·2	98·7	101·6	103·9	105·9	107·8
10	109·4	110·8	112·3	113·5	114·8	116·0	117·1	118·2	119·3	120·3
9	121·3	122·3	123·2	124·1	125·0	125·8	126·8	127·6	128·4	129·2
8	130·0	130·8	131·5	132·3	133·0	133·7	134·5	135·2	135·9	136·6
7	137·3	137·9	138·6	139·3	139·9	140·6	141·3	141·9	142·5	143·1
6	143·8	144·4	145·0	145·6	146·3	146·8	147·4	148·0	148·6	149·2
5	149·8	150·3	150·9	151·4	152·0	152·6	153·1	153·7	154·3	154·8
4	155·3	155·9	156·4	157·0	157·5	158·0	158·6	159·1	159·6	160·1
3	160·6	161·2	161·7	162·2	162·7	163·3	163·8	164·3	164·8	165·3
2	165·8	166·3	166·8	167·3	167·8	168·3	168·8	169·3	169·8	170·3
1	170·8	171·3	171·8	172·3	172·8	173·3	173·7	174·2	174·7	175·2
0	175·6	176·1	176·6	177·1	177·6	178·1	178·6	179·1	179·5	180·0

Degrees.

−	·9	·8	·7	·6	·5	·4	·3	·2	·1	·0
11	.	..	..	..	274·2	278·7	281·6	283·9	285·9	28
10	289·4	290·8	292·3	293·5	294·8	296·0	297·1	298·2	299·3	30
9	301·3	302·3	303·2	304·1	305·0	305·8	306·8	307·6	308·4	30
8	310·0	310·8	311·5	312·3	313·0	313·7	314·5	315·2	315·9	31
7	317·3	317·9	318·6	319·3	319·9	320·6	321·3	321·9	322·5	32
6	323·8	324·4	325·0	325·6	326·3	326·8	327·4	328·0	328·6	32
5	329·8	330·3	330·9	331·4	332·0	332·6	333·1	333·7	334·3	33
4	335·3	335·9	336·4	337·0	337·5	338·0	338·6	339·1	339·6	34
3	340·6	341·2	341·7	342·2	342·7	343·3	343·8	344·3	344·8	34
2	345·8	346·3	346·8	347·3	347·8	348·3	348·8	349·3	349·8	35
1	350·8	351·3	351·8	352·3	352·8	353·3	353·7	354·2	354·7	35
0	355·6	356·1	356·6	357·1	357·6	358·1	358·6	359·1	359·5	36

TABLE IV.—Mercury.

Data for calculating latitude and geocentric longitude of Mercury from 1 B.C. to A.D. 2000

Mercury's mean motion for centuries.

A.D.	Kaliyuga.	Mean longitude at commencement of solar year.	Longitude of apsis.	Longitude of node
		Deg.	Deg.	Deg.
1 B.C.	3101 K.Y.	209·3843	220·4118	20·7580
100 A.D.	3201	285·4023	220·4149	20·7539
200	3301	1·4203	220·4180	20·7499
300	3401	77·4383	220·4210	20·7458
400	3501	153·4563	220·4241	20·7417
500	3601	229·4744	220·4272	20·7377
600	3701	305·4924	220·4302	20·7336
700	3801	21·5104	220·4333	20·7295
800	3901	97·5284	220·4363	20·7255
900	4001	173·5464	220·4394	20·7214
1000 A.D.	4101 K.Y.	249·5645	220·4425	20·71
1100	4201	325·5825	220·4455	20·71
1200	4301	41·6005	220·4486	20·70
1300	4401	117·6185	220·4517	20·70
1400	4501	193·6365	220·4547	20·70
1500	4601	269·6546	220·4578	20·69
1600	4701	345·6726	220·4609	20·69
1700	4801	61·6906	220·4639	20·68
1800	4901	137·7086	220·4670	20·68
1900	5001	213·7266	220·4701	20·68
2000	5101	289·7447	220·4731	20·67

Mercury's mean motion for odd years.

Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.
1	54·76	**11**	242·36	**21**	69·96	**31**	257·57	**41**	85·17	**51**	272·77	**61**	100·37	**71**	287·97	**81**	115·57	**91**	308
2	109·52	**12**	297·12	**22**	124·72	**32**	312·33	**42**	139·93	**52**	327·53	**62**	155·13	**72**	342·73	**82**	170·33	**92**	357·
3	164·28	**13**	251·88	**23**	179·48	**33**	7·09	**43**	194·69	**53**	22·29	**63**	209·89	**73**	37·49	**83**	225·09	**93**	52·
4	219·04	**14**	46·64	**24**	234·24	**34**	61·85	**44**	249·45	**54**	77·05	**64**	264·65	**74**	92·25	**84**	279·85	**94**	107·
5	273·80	**15**	101·40	**25**	289·00	**35**	116·61	**45**	304·21	**55**	131·81	**65**	319·41	**75**	147·01	**85**	334·61	**95**	162·
6	328·56	**16**	156·16	**26**	343·76	**36**	171·37	**46**	358·97	**56**	186·57	**66**	14·17	**76**	201·77	**86**	29·37	**96**	216·
7	23·32	**17**	210·92	**27**	38·52	**37**	226·13	**47**	53·73	**57**	241·33	**67**	68·93	**77**	256·53	**87**	84·13	**97**	271·
8	78·08	**18**	265·68	**28**	93·28	**38**	280·89	**48**	108·49	**58**	296·09	**68**	123·69	**78**	311·29	**88**	138·89	**98**	326·
9	132·84	**19**	320·44	**29**	148·04	**39**	335·65	**49**	163·25	**59**	350·85	**69**	178·45	**79**	6·05	**89**	193·66	**99**	21·
10	187·60	**20**	15·20	**30**	202·80	**40**	30·41	**50**	218·01	**60**	45·61	**70**	233·21	**80**	60·81	**90**	248·42	**100**	76·

TABLE IV.—Mercury—*cont.*

Mercury's mean motion for days.

Degrees.

Days.	0	1	2	3	4	5	6	7	8	9
0	...	4·09	8·18	12·28	16·37	20·46	24 55	28·65	82·74	36·83
1	40·92	45·02	49·11	58 20	57·29	61·38	65·48	69·57	73·66	77·75
2	81·87	85 94	90·03	94·12	98·22	102·31	106·40	110·49	114·59	118·68
3	122 77	126·86	180·95	135·05	139·14	143 23	147·32	151·42	155·51	159·60
4	163·69	167·79	171·88	175·97	180 06	184 15	188 25	192 34	196·43	200·52
5	204·62	208·71	212·80	216·89	220·99	225·08	229·17	233·26	237·36	241·45
6	245·54	249·63	253·72	257·82	261·91	266·00	270·09	274·19	278·28	282·37
7	286·46	290·56	294·65	298·74	302·83	306 92	311·02	315·11	319·20	323 29
8	327·39	331·48	335·57	339·66	343·76	347 85	351·94	356 03	0 13	4·22
9	8 31	12 40	16·49	20·59	24·68	28·77	32 86	36·96	41 05	45 14
10	49·23	53·33	57·42	61 51	65·60	69·69	73·79	77 88	81·97	86·06
11	90·16	94·25	98·34	102 43	106·53	118·62	114·71	118·80	122 90	126 99
12	131·08	135·17	139·26	143·36	147·45	151·54	155·63	159·73	163·82	167·91
13	172·00	176 10	180·19	184 28	188·37	192·47	196 56	200·65	204 74	208 83
14	212·93	217 02	221·11	225·20	229 80	233 39	237·48	247 57	245 67	249 76
15	253 85	257·94	262 03	266·18	270 22	274 31	278·40	282 50	286 59	290·68
16	294·77	298·87	302·96	307·05	311 14	315·24	319 33	323 42	327 51	331 60
17	335·70	339 79	343 88	347·97	352·07	356·16	0·25	4·34	8·44	12 53
18	16·62	20·71	24·80	28·90	32·99	37·08	41·17	45·27	49·36	53·45
19	57·54	61 64	65·73	69·82	73·91	78·01	82·10	86·19	90 28	94·37
20	98·47	102·56	106 65	110·74	114 84	118 93	123·02	127·11	131·21	135·30
21	139·89	143 48	147·58	151·67	155·76	159·85	163·94	168·04	172 98	176·22
22	180·31	184 41	188·50	192·59	196·68	200·78	201·87	208·96	213·05	217·15
23	221 24	225·33	228·42	233·51	237·61	241·70	245·80	249 88	253·98	258·07
24	262·16	266 25	270 35	274·44	278 53	282·62	286·71	290·80	294 90	298 99
25	303·08	307 18	311 27	315 36	319·45	323·55	327·64	331·73	335·82	339 92
26	344·01	348·10	352 19	356 28	0·38	4·47	8·56	12·65	16·75	20·84
27	24·93	29·02	33·12	37 21	41·30	45·39	49 49	53 58	57·67	61·76
28	65·85	69·95	74·04	78·13	82·22	86·32	90·41	94·50	98·59	102·69
29	106 78	110·87	114·96	119·05	123·15	127·24	131·33	135·42	139·52	143·61
30	147·70	151 79	155 89	159·98	164 07	168 16	172·26	176 35	180·41	184 53
31	188·62	192 72	196 81	200 90	204·99	209·09	213 18	217·27	221·36	225·46
32	229 55	233·64	237·73	241·82	245·92	250·00	254·10	258·19	262·29	266·38
33	270·47	274·56	278·66	282·75	286·84	290·93	295·03	299·12	303·21	307 30
34	311·39	315 49	319·58	323·67	327 76	331·86	335·95	340·04	344·13	348·23
35	352·32	356·41	0 50	4 60	8 69	12 78	16·87	20·96	25·06	29·15
36	33 24	37·33	41·43	45·52	49·61	53 70	...	...	...	...

Mercury's annual equation.

	Degrees.	—
0	0·0	360·0
1	3 7	356·3
2	7·4	352·6
3	11·2	348·8
4	14.9	345·1
5	18 7	341·3
6	22·5	337·5
7	26·4	333·6
8	30·2	329 8
9	34·7	325·3
10	38·2	321·8
11	42·3	317·7
12	46 5	313·5
13	50·7	309 3
14	55 2	304·8
15	59 8	300·2
16	64·6	295·4
17	69 8	290 2
18	75 4	284·6
19	81·6	278·4
20	88·7	271·3
21	98 6	261·4
21 5	112 2	247·8
	..	—
21	123 7	236·3
20	131 5	228·5
19	138 6	228 4
18	140·7	219 3
17	144·3	215·7
16	147·4	212·6
15	150·3	209·7
14	152·9	207·1
13	155·3	204 7
12	157·6	202 4
11	159 8	200 2
10	161·9	198·1
9	163·9	196·1
8	165 8	194·2
7	167 7	192 3
6	169·5	190·5
5	171·3	188·7
4	173·1	186·9
3	174·8	185·2
2	176·6	183 4
1	178 3	181·7
0	180 0	180·0

Mercury's anomaly.

Degrees.

	..	...	—	—
0·0	0·0	180·0	180·0	360·0
0·1	1·2	178·8	181·2	358·8
0 2	2·4	177·6	182·4	357·6
0·3	3·6	176 4	183·6	356·4
0·4	4 9	175·1	184·9	355·1
0·5	6·0	174·0	186·0	354·0
0 6	7·2	172·8	187 2	352·8
0·7	8·5	171·5	188·5	351·5
0·8	9·7	170·3	189·7	350·3
0·9	11·0	169 0	191·0	349·0
1·0	12·2	167·8	192·2	347 8
1·1	13·5	166·5	193·5	346·5
1·2	14·7	165·3	194·7	345·3
1·3	16 1	163·9	196·1	343·9
1·4	17·4	162·6	197·4	342 6
1·5	18·7	161·3	198 7	341·3
1·6	20·1	159·9	200·1	339·9
1·7	21·5	158 5	201·5	338·5
1·8	22·7	157 3	202·7	337·3
1·9	24·2	155 8	204·2	335 8
2·0	25·6	154 4	205 6	334·4
2·1	27·0	153·0	207 0	333·0
2·2	28·5	151·5	208·5	331·5
2·3	29·9	150·1	209·9	330·1
2·4	31 4	148·6	211·4	328·6
2·5	33·0	147·0	213·0	327·0
2·6	34·5	145·5	214·5	325·5
2 7	36·0	144·0	216·0	324·0
2·8	37 7	142·3	217·7	322·3
2 9	39·4	140·6	219·4	320·6
3·0	41·2	138 8	221 2	318 8
3·1	42·9	137·1	222·9	317·1
3·2	44·7	135 3	224·7	315 3
3 3	46·6	133 4	226·6	313·4
3 4	48 5	131·5	228·5	311·5
3·5	50·6	129·4	230·6	309·4
3 6	52·7	127·3	232·7	307·3
3·7	55·0	125·0	235·0	305·0
3 8	57·5	122·5	237·5	302·5
3 9	60 0	120·0	240 0	300 0
4·0	63 0	117·0	243·0	297·0
4·1	66·0	114·0	246·0	294 0
4·2	69 7	110·2	249·7	290·2
4·3	74·0	106 0	254 0	286·0
4·4	80·5	99 5	260 5	279·5
4·5	90·0	90·0	270·0	270·0

TABLE IV.—Jupiter.

Data for calculating latitude and geocentric longitude of Jupiter from B.C.1 to A.D. 2000.

Jupiter's mean motion for centuries.

A.D.	Kaliyuga.	Mean longitude at commencement of solar year.	Longitude of apsis.	Longitude of node.
		Deg	Deg.	Deg.
1 B.C.	3101 K.Y.	163·1655	171·2250	79·6967
100 A.D.	3201	317·9101	171·2325	79·6952
200	3301	112·6547	171·2400	79·6938
300	3401	267·3993	171·2475	79·6923
400	3501	62·1439	171·2550	79·6909
500	3601	216·8885	171·2625	79·6894
600	3701	11·6331	171·2700	79·6880
700	3801	166·3778	171·2776	79·6865
800	3901	321·1225	171·2851	79 6851
900	4001	115·8671	171·2926	79·6836

A.D.	Kaliyuga.	Mean longitude. at commencement of solar year.	Longitude of apsis.	Longitude of node
		Deg.	Deg.	Deg.
1000 A.D.	4101 K.Y.	270·6117	171 3001	79·6822
1100	4201	65·3563	171 3076	79·6807
1200	4301	220·1009	171·3151	79·6793
1300	4401	14·8455	171·3226	79·6778
1400	4501	169·5901	171·3301	79·6764
1500	4601	324 3347	171·3376	79·6749
1600	4701	119·0793	171·3451	79·6735
1700	4801	273·8239	171·3526	79·6720
1800	4901	68·5685	171·3601	79·6706
1900	5001	223·3130	171·3676	79·6691
2000	5101	18·0576	171·3752	79·6677

TABLE IV—Jupiter—*cont.*

Jupiter's mean motion for Odd Years. (Used at p. 97 of Text.)

Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg	Yrs.	Deg.	Yrs.	Deg.
1	30·35	**11**	333·82	**21**	277·30	**31**	220·77	**41**	164·24	**51**	107·72	**61**	51·19	**71**	354·67	**81**	298·14	**91**	241·62
2	60·69	**12**	4·17	**22**	307·64	**32**	251·12	**42**	194·59	**52**	138·07	**62**	81·54	**72**	25·02	**82**	328·49	**92**	271·96
3	91·04	**13**	34·52	**23**	337·99	**33**	281·46	**43**	224·94	**53**	168·41	**63**	111·89	**73**	55·36	**83**	358·84	**93**	302·31
4	121·39	**14**	64·86	**24**	8·34	**34**	311·81	**44**	255·29	**54**	198·76	**64**	142·24	**74**	85·71	**84**	29·18	**94**	332·66
5	151·74	**15**	95·21	**25**	38·69	**35**	342·16	**45**	285·63	**55**	229·11	**65**	172·58	**75**	116·06	**85**	59·53	**95**	3·01
6	182·08	**16**	125·56	**26**	69·03	**36**	12·51	**46**	315·98	**56**	259·46	**66**	202·93	**76**	146·41	**86**	89·88	**96**	33·35
7	212·43	**17**	155·91	**27**	99·38	**37**	42·85	**47**	346·33	**57**	289·80	**67**	233·28	**77**	176·75	**87**	120·23	**97**	63·70
8	242·78	**18**	186·25	**28**	129·73	**38**	73·20	**48**	16·68	**58**	320·15	**68**	263·63	**78**	207·10	**88**	150·57	**98**	94·05
9	273·13	**19**	216·60	**29**	160·07	**39**	103·55	**49**	47·02	**59**	350·50	**69**	293·97	**79**	237·45	**89**	180·92	**99**	124·40
10	303·47	**20**	246·95	**30**	190·42	**40**	133·90	**50**	77·37	**60**	20·85	**70**	324·32	**80**	267·80	**90**	211·27	**100**	154·74

Jupiter's mean motion for Days (Used at p 97 of Text.)

Degrees.

Days.	0	1	2	3	4	5	6	7	8	9
0		0·80	0·17	0·25	0·33	0·41	0·50	0·58	0·66	0·75
1	0·83	0·91	1·00	1·08	1·16	1·25	1·33	1·41	1·50	1·58
2	1·66	1·74	1·83	1·91	1·99	2·07	2·16	2·24	2·33	2·41
3	2·49	2·58	2·66	2·74	2·82	2·91	2·99	3·07	3·16	3·24
4	3·32	3·41	3·49	3·57	3·66	3·74	3·82	3·90	3·99	4·07
5	4·15	4·24	4·32	4·40	4·49	4·57	4·65	4·74	4·82	4·90
6	4·99	5·07	5·15	5·23	5·32	5·40	5·48	5·57	5·65	5·73
7	5·82	5·90	5·98	6·07	6·15	6·23	6·31	6·40	6·48	6·56
8	6·65	6·73	6·81	6·90	6·98	7·06	7·15	7·23	7·31	7·39
9	7·48	7·56	7·64	7·73	7·81	7·89	7·98	8·06	8·14	8·23
10	8·31	8·39	8·47	8·56	8·64	8·72	8·81	8·89	8·97	9·06
11	9·14	9·22	9·31	9·39	9·47	9·55	9·64	9·72	9·80	9·89
12	9·97	10·05	10·14	10·22	10·30	10·39	10·47	10·55	10·64	10·72
13	10·80	10·88	10·97	11·05	11·13	11·22	11·30	11·38	11·47	11·55
14	11·63	11·72	11·80	11·88	11·96	12·05	12·13	12·21	12·30	12·38
15	12·46	12·55	12·63	12·71	12·80	12·88	12·96	13·04	13·13	13·21
16	13·29	13·38	13·46	13·54	13·63	13·71	13·79	13·88	13·96	14·04
17	14·13	14·21	14·29	14·37	14·46	14·54	14·62	14·71	14·79	14·87
18	14·96	15·04	15·12	15·21	15·29	15·37	15·45	15·54	15·62	15·70
19	15·79	15·87	15·95	16·04	16·12	16·20	16·29	16·37	16·45	16·53
20	16·62	16·70	16·78	16·87	16·95	17·03	17·12	17·20	17·28	17·37
21	17·45	17·53	17·61	17·70	17·78	17·86	17·95	18·03	18·11	18·20
22	18·28	18·36	18·45	18·53	18·61	18·70	18·78	18·86	18·94	19·03
23	19·11	19·19	19·28	19·36	19·44	19·53	19·61	19·69	19·78	19·86
24	19·94	20·02	20·11	20·19	20·27	20·36	20·44	20·52	20·61	20·69
25	20·77	20·86	20·94	21·02	21·11	21·19	21·27	21·35	21·44	21·52
26	21·60	21·69	21·77	21·85	21·94	22·02	22·10	22·18	22·27	22·35
27	22·43	22·52	22·60	22·68	22·77	22·85	22·93	23·02	23·10	23·18
28	23·27	23·35	23·43	23·51	23·60	23·68	23·76	23·85	23·93	24·01
29	24·10	24·18	24·26	24·35	24·43	24·51	24·59	24·68	24·76	24·84
30	24·93	25·01	25·09	25·18	25·26	25·34	25·43	25·51	25·59	25·67
31	25·76	25·84	25·92	26·01	26·09	26·17	26·26	26·34	26·42	26·51
32	26·59	26·67	26·75	26·84	26·92	27·00	27·09	27·17	27·25	27·34
33	27·42	27·50	27·59	27·67	27·75	27·84	27·92	28·00	28·08	28·17
34	28·25	28·33	28·42	28·50	28·58	28·67	28·75	28·83	28·92	29·00
35	29·08	29·16	29·25	29·33	29·41	29·50	29·58	29·66	29·75	29·83
36	29·91	30·00	30·08	30·16	30·24	30·33		..	..	..

Jupiter's Annual Equation. (Used at p. 97 of Text.)

Degrees.

+	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	0·0	0·6	1·2	1·8	2·4	3·1	3·7	4·3	4·9	5·5
1	6·1	6·7	7·4	8·0	8·6	9·2	9·8	10·4	11·1	11·7
2	12·2	12·9	13·5	14·1	14·7	15·4	16·0	16·6	17·2	17·9
3	18·5	19·1	19·7	20·4	21·0	21·6	22·2	22·9	23·5	24·2
4	24·8	25·4	26·1	26·7	27·4	28·0	28·6	29·2	29·9	30·6
5	31·2	31·9	32·6	33·2	33·9	34·5	35·2	35·9	36·6	37·2
6	37·9	38·6	39·3	40·0	40·7	41·4	42·0	42·8	43·5	44·2
7	44·9	45·7	46·4	47·2	47·9	48·6	49·4	50·2	50·9	51·7
8	52·4	53·2	54·0	54·8	55·7	56·4	57·3	58·2	59·0	59·8
9	60·7	61·6	62·5	63·4	64·4	65·3	66·3	67·2	68·3	69·4
10	70·4	71·5	72·7	73·9	75·0	76·4	77·6	79·0	80·5	82·0
11	83·7	85·5	87·3	90·0	93·0	97·5		..	...	...

Degrees.

–	·0	·1	·2	·3	·4	·5	·6	7	·8	·9
0	180·0	180·4	180·8	181·3	181·7	182·1	182·5	182·9	183·3	183·7
1	184·1	184·5	185·0	185·4	185·8	186·2	186·6	187·0	187·5	187·9
2	188·3	188·7	189·1	189·6	190·0	190·4	190·8	191·3	191·7	192·1
3	192·5	193·0	193·4	193·8	194·3	194·7	195·1	195·5	196·0	196·4
4	196·9	197·3	197·8	198·2	198·6	199·1	199·6	200·0	200·5	200·9
5	201·4	201·8	202·3	202·8	203·2	203·7	204·2	204·7	205·2	205·6
6	206·1	206·6	207·1	207·6	208·1	208·6	209·1	209·6	210·1	210·7
7	211·2	211·7	212·3	212·8	213·4	213·9	214·5	215·1	215·6	216·2
8	216·8	217·4	217·9	218·6	219·2	219·8	220·4	221·1	221·8	222·4
9	223·2	223·8	224·6	225·3	226·0	226·8	227·6	228·3	229·2	229·9
10	230·9	231·8	232·8	233·8	234·8	236·0	237·0	238·1	239·4	240·8
11	242·3	243·8	245·8	247·8	250·5	255·0	...	...	..	...

Maximum Equation 11·54 for Anomaly of 103·00.

Degrees

+	·9	·8	·7	·6	·5	·4	·3	·2	·1	·0
11	...	...		..	105·0	109·5	112·2	114·2	116·2	117·7
10	119·2	120·6	121·9	123·0	124·0	125·2	126·2	127·2	128·2	129·1
9	130·1	130·8	131·7	132·4	133·2	134·0	134·7	135·4	136·2	136·8
8	137·6	138·2	138·9	139·6	140·2	140·8	141·4	142·1	142·6	143·2
7	143·8	144·4	144·9	145·5	146·1	146·6	147·2	147·7	148·3	148·8
6	149·3	149·9	150·4	150·9	151·4	151·9	152·4	152·9	153·4	153·9
5	154·4	154·8	155·3	155·8	156·3	156·8	157·2	157·7	158·2	158·6
4	159·1	159·5	160·0	160·4	160·9	161·4	161·8	162·2	162·7	163·1
3	163·6	164·0	164·5	164·9	165·3	165·7	166·2	166·6	167·0	167·5
2	167·9	168·3	168·7	169·2	169·6	170·0	170·4	170·9	171·3	171·7
1	172·1	172·5	173·0	173·4	173·8	174·2	174·6	175·0	175·5	175·9
0	176·3	176·7	177·1	177·5	177·9	178·3	178·7	179·2	179·6	180·0

Maximum Equation 11·54 for Anomaly of 257·00

Degrees.

–	·9	·8	·7	·6	5	·4	·3	·2	·1	·0
11	...	.	...	...	262·5	267·0	270·0	272·5	274·5	276·3
10	278·0	279·5	281·0	282·4	283·6	285·0	286·4	287·3	288·5	289·6
9	290·6	291·7	292·8	293·7	294·7	295·6	296·6	297·5	298·4	299·3
8	300·2	301·0	301·8	302·7	303·6	304·3	305·2	306·0	306·8	307·6
7	308·3	309·1	309·8	310·6	311·4	312·1	312·8	313·6	314·3	315·1
6	315·8	316·5	317·2	318·0	318·6	319·3	320·0	320·7	321·4	322·1
5	323·8	323·4	324·1	324·8	325·5	326·1	326·8	327·4	328·1	328·8
4	329·4	330·1	330·8	331·4	332·0	332·6	333·3	[illegible]	334·6	335·9
3	335·8	336·5	337·1	337·8	338·4	339·0	339·6	340·3	340·9	341·5
2	342·1	342·8	343·4	344·0	344·6	345·3	345·9	346·5	347·1	347·8
1	348·3	348·9	349·6	350·2	350·8	351·4	352·0	352·6	353·3	353·9
0	354·5	355·1	355·7	356·3	356·9	357·6	358·2	358·8	359·4	360·0

TABLE IV—Jupiter—*cont.*

Jupiter's Anomaly. (Used at p. 97 of Text.)

+	0	1	2	3	4	5	6	7	8	9
	Degrees									
0	0·0	1·1	2·2	3·2	4·4	5·5	6·6	7·7	8·8	9·9
1	11·0	12·2	13·3	14·5	15·6	16·7	17·9	19·1	20·2	21·5
2	22·6	23·9	25·1	26·4	27·6	28·9	30·2	31·5	32·9	34·1
3	35·5	37·0	38·4	39·9	41·4	42·9	44·5	46·1	47·7	49·5
4	51·2	53·1	55·0	57·1	59·2	61·7	64·0	67·0	70·0	74·0
5	77·5	90·0	...	..	..	.	..	...		..

−	0	1	2	3	4	5	6	7	8	9
	Degrees.									
0	180·0	181·1	182·2	183·2	184·4	185·5	186·6	187·7	188·8	189·9
1	191·0	192·2	193·3	194·5	195·6	196·7	197·9	199·0	200·2	201·5
2	202·6	203·9	205·1	206·4	207·6	208·9	210·2	211·5	212·9	214·1
3	215·5	217·0	218·4	219·9	221·4	222·6	224·5	226·1	227·7	229·5
4	231·2	233·1	235·0	237·1	239·2	241·7	244·0	247·0	250·2	254·0
5	257·5	270·0	...	.	.		...	.		

Maximum Equation 5·0994 for Anomaly of 90·00

+	9	8	7	6	5	4	3	2	1	0
	Degrees									
5	..		..	...		.	...	...	90·0	102·5
4	106·0	110·0	113·0	116·0	118·3	120·8	122·9	125·0	126·9	128·8
3	130·5	132·3	133·9	135·5	137·1	138·6	140·1	141·6	143·0	144·5
2	145·9	147·1	148·5	149·8	151·1	152·4	153·6	154·9	156·1	157·4
1	158·5	159·8	160·9	162·1	163·3	164·4	165·5	166·7	167·8	169·0
0	170·1	171·2	172·3	173·4	174·5	175·6	176·8	177·8	178·9	180·0

Maximum Equation 5·0994 for Anomaly of 270·00

−	9	8	7	6	5	4	3	2	1	0
	Degrees									
5	..	.. .		..	.	...	...		270·0	282·5
4	286·0	290·0	293·0	296·0	298·3	300·8	302·9	305·0	306·9	308·8
3	310·5	312·3	313·9	315·5	317·1	318·6	320·1	321·6	323·0	324·5
2	325·9	327·1	328·5	329·8	331·1	332·4	333·6	334·9	336·1	337·1
1	338·5	339·8	340·9	342·1	343·3	344·4	345·5	346·7	347·8	349·0
0	350·1	351·2	352·3	353·4	354·5	355·6	356·8	357·8	358·9	360·0

TABLE IV—Venus.

Data for calculating Latitude and geocentric Longitude of Venus from B C 1 to A D 2000

(For Centuries B C. see p 331)

Venus' mean motion for Centuries (Used at p. 95 of Text.)

A.D	Kaliyuga		Mean long. at commencement of Solar Year	Longitude of apsis	Longitude of node
			Deg	Deg	Deg
1 B C	3101	K Y	303·2772	79·7837	59·8039
100 A D	3201		142·2621	79·7882	59·7964
200	3301		341·2475	79·7926	59·7889
300	3401		180·2327	79·7971	59·7814
400	3501		19·2178	79·8016	59·7738
500	3601		218·2030	79·8060	59·7663
600	3701		57·1882	79·8105	59·7588
700	3801		256·1733	79·8149	59·7513
800	3901		95·1585	79·8194	59·7438
900	4001		294·1436	79·8238	59·7363

A.D	Kaliyuga.		Mean long. at commencement of Solar Year.	Longitude of apsis.	Longitude of node.
			Deg	Deg	Deg.
1000 A D	4101	K Y	133·1288	79·8283	59·7288
1100	4201		332·1140	79·8328	59·7213
1200	4301		171·0991	79·8372	59·7138
1300	4401		10·0843	79·8417	59·7063
1400	4501		209·0694	79·8461	59·6988
1500	4601		18·0546	79·8506	59·6913
1600	4701		247·0398	79·8550	59·6838
1700	4801		86·0249	79·8595	59·6763
1800	4901		285·0101	79·8639	59·6687
1900	5001		123·9952	79·8684	59·6612
2000	5101		322·9804	79·8728	59·6537

Venus' mean motion for Odd Years. (Used at p 95 of Text)

Yrs.	Deg.	Yrs.	Deg.	Yrs	Deg.	Yrs	Deg	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.
1	225·10	**11**	317·09	**21**	48·99	**31**	110·88	**41**	232·78	**51**	324·68	**61**	56·58	**71**	148·48	**81**	240·38	**91**	332·28
2	90·38	**12**	182·28	**22**	274·18	**32**	6·07	**42**	97·97	**52**	189·87	**62**	281·77	**72**	13·67	**82**	105·57	**92**	197·47
3	315·57	**13**	47·47	**23**	139·37	**33**	231·26	**43**	323·16	**53**	55·06	**63**	146·96	**73**	238·86	**83**	330·76	**93**	62·66
4	180·76	**14**	272·66	**24**	4·56	**34**	96·45	**44**	188·35	**54**	280·25	**64**	12·15	**74**	104·05	**84**	195·95	**94**	287·85
5	45·95	**15**	137·85	**25**	229·75	**35**	321·64	**45**	53·54	**55**	145·44	**65**	237·34	**75**	329·24	**85**	61·14	**95**	153·04
6	271·14	**16**	3·04	**26**	94·94	**36**	186·83	**46**	278·73	**56**	10·63	**66**	102·53	**76**	194·43	**86**	286·33	**96**	18·23
7	136·33	**17**	228·23	**27**	320·13	**37**	52·02	**47**	143·92	**57**	235·82	**67**	327·72	**77**	59·62	**87**	151·52	**97**	243·42
8	1·52	**18**	93·42	**28**	185·32	**38**	277·21	**48**	9·11	**58**	101·01	**68**	192·91	**78**	284·81	**88**	16·71	**98**	108·60
9	226·71	**19**	318·61	**29**	50·51	**39**	142·40	**49**	234·30	**59**	326·20	**69**	58·10	**79**	150·00	**89**	241·90	**99**	333·79
10	91·90	**20**	183·80	**30**	275·70	**40**	7·59	**50**	99·49	**60**	191·39	**70**	283·29	**80**	15·19	**90**	107·09	**100**	198·98

TABLE IV—Venus—*cont.*

Venus' mean motion for Days. (P. 95 of Text.)

Degrees

Days.	0	1	2	3	4	5	6	7	8	9
0		1·60	3·20	4·81	6·41	8·01	9·61	11·21	12·82	14·42
1	16·02	17·62	19·23	20·83	22·43	24·03	25·63	27·24	28·84	30·44
2	32·04	33·64	35·25	36·65	38·45	40·05	41·65	43·26	44·86	46·46
3	48·06	49·67	51·27	52·87	54·47	56·07	57·68	59·28	60·88	62·48
4	64·08	65·68	67·29	68·89	70·49	72·09	73·70	75·30	76·90	78·50
5	80·11	81·71	83·31	84·91	86·51	88·12	89·72	91·32	92·32	94·53
6	96·13	97·73	99·33	100·93	102·54	104·14	105·74	107·34	108·94	110·55
7	112·15	113·75	115·35	116·95	118·56	120·16	121·76	123·36	124·97	126·57
8	128·70	129·77	131·37	132·98	134·58	136·18	137·78	139·38	140·99	142·59
9	144·19	145·79	147·40	149·00	150·60	152·20	153·80	155·41	157·01	158·61
10	160·21	161·81	163·42	165·02	166·62	168·22	169·83	171·43	173·03	174·63
11	176·23	177·84	179·44	181·04	182·64	182·24	185·85	187·45	189·05	190·65
12	192·25	193·86	195·46	197·06	198·66	200·27	201·87	203·47	205·07	206·67
13	208·28	209·88	211·48	213·08	214·69	216·29	217·89	219·49	221·09	222·70
14	224·30	225·90	227·50	229·10	230·71	232·31	233·91	235·51	237·11	238·72
15	240·32	241·92	243·52	245·13	246·73	248·33	249·93	251·53	253·14	254·74
16	256·34	257·94	259·54	261·15	262·75	264·35	265·95	267·56	269·16	270·76
17	272·36	273·96	275·57	277·17	278·77	280·37	281·97	283·58	285·18	286·78
18	288·38	289·98	291·59	293·19	294·79	296·39	297·99	299·60	301·20	302·80
19	304·40	306·01	307·61	309·21	310·81	312·41	314·02	315·62	317·22	318·82
20	320·43	322·03	323·63	325·23	326·83	328·44	330·04	331·64	333·24	334·84
21	336·45	338·05	339·65	341·25	342·86	344·46	346·06	347·66	349·26	350·87
22	352·47	354·07	355·67	357·27	358·88	0·48	2·08	3·68	5·29	6·89
23	8·49	10·09	11·69	13·30	14·90	16·50	18·10	19·70	21·31	22·91
24	24·51	26·11	27·72	29·32	30·92	32·52	34·12	35·73	37·33	38·93
25	40·53	42·13	43·74	45·34	46·94	48·54	50·15	51·75	53·35	54·95
26	56·55	58·16	59·76	61·36	62·96	64·56	66·17	67·77	69·37	70·97
27	72·57	74·17	75·78	77·38	78·98	80·59	82·19	83·79	85·39	86·99
28	88·60	90·20	91·80	93·40	95·00	96·61	98·21	99·81	101·41	103·02
29	104·62	106·22	107·82	109·42	111·03	112·63	114·23	115·83	117·43	119·04
30	120·64	122·24	123·84	125·45	127·05	128·65	130·25	131·85	133·46	135·06
31	136·66	138·26	139·86	141·47	143·07	144·67	146·27	147·87	149·48	151·08
32	152·68	154·28	155·89	157·49	159·09	160·69	162·29	163·90	165·50	167·10
33	168·70	170·30	171·91	173·51	175·11	176·71	178·32	179·92	181·52	183·12
34	184·72	186·33	187·93	189·53	191·13	192·73	194·34	195·94	197·54	199·14
35	200·75	202·35	203·95	205·55	207·15	208·76	210·36	211·96	213·56	215·16
36	216·77	218·37	219·97	221·57	223·18	224·78	...	...	.	...

Venus' Annual Equation. (P. 96 of Text.)

Degrees.

	+	+	−	−
0	0·0	180·0	180·0	360·0
1	2·4	179·6	180·4	357·6
2	4·7	179·2	180·8	355·3
3	7·1	178·8	181·2	352·9
4	9·5	178·5	181·5	350·5
5	11·9	178·1	181·9	348·1
6	14·3	177·7	182·3	345·7
7	16·7	177·3	182·7	343·3
8	19·1	176·9	183·1	340·9
9	21·4	176·6	183·4	338·6
10	23·9	176·2	183·8	336·1
11	26·3	175·8	184·2	333·7
12	28·7	175·3	184·7	331·3
13	31·1	174·9	185·1	328·9
14	33·5	174·5	185·5	326·5
15	35·9	174·1	185·9	324·1
16	38·4	173·7	186·3	321·6
17	40·8	173·2	186·8	319·2
18	43·2	172·8	187·2	316·8
19	45·7	172·4	187·6	314·3
20	48·2	171·9	188·1	311·8
21	50·6	171·4	188·6	309·4
22	53·1	170·9	189·1	306·9
23	55·6	170·4	189·6	304·4
24	58·2	169·9	190·1	301·8
25	60·7	169·4	190·6	299·3
26	63·3	168·9	191·1	296·7
27	65·9	168·3	191·7	294·1
28	68·4	167·7	192·3	291·6
29	71·1	167·1	192·9	288·9
30	73·8	166·4	193·6	286·2
31	76·4	165·8	194·2	283·6
32	79·1	165·1	194·9	280·9
33	81·9	164·3	195·7	278·1
34	84·7	163·5	196·5	275·3
35	87·5	162·7	197·3	272·5
36	90·4	161·9	198·1	269·6
37	93·4	161·0	199·0	266·6
38	96·4	159·9	200·1	263·6
39	99·6	158·8	201·2	260·4
40	102·8	157·7	202·3	257·2
41	106·2	156·2	203·8	253·8
42	109·8	154·6	205·4	250·2
43	113·6	152·8	207·2	246·4
44	117·9	150·6	209·4	242·1
45	122·9	147·8	212·2	237·1
46	129·7	142·8	217·2	230·3
46 38	135·0	.	225·0	...

Venus' Anomaly. (P. 96 of Text.)

Degrees.

	+	−
0·0	0·0	180·0
0·1	3·0	183·0
0·2	6·0	186·0
0·3	9·2	189·2
0·4	12·2	192·2
0·5	15·5	195·5
0·6	18·7	198·7
0·7	22·2	202·2
0·8	25·7	205·7
0·9	29·5	209·5
1·0	33·2	213·2
1·1	37·2	217·2
1·2	41·5	221·5
1·3	45·2	225·2
1·4	51·5	231·5
1·5	57·7	237·5
1·6	64·7	244·7
1·7	75·0	255·0
1·75	90·0	270·0
	+	**−**
1·7	105·0	285·0
1·6	115·3	295·8
1·5	122·3	302·2
1·4	128·5	308·5
1·3	134·8	314·8
1·2	138·5	318·5
1·1	142·8	322·8
1·0	146·8	326·8
0·9	150·5	330·5
0·8	154·3	334·3
0·7	157·8	337·8
0·6	161·3	341·3
0·5	164·5	344·5
0·4	167·8	347·8
0·3	170·8	350·8
0·2	174·0	354·0
0·1	177·0	357·0
0·0	180·0	360·0

TABLE IV—Saturn.

Data for calculating Latitude and geocentric Longitude of Saturn from B.C. 1 to A.D. 2000.

Saturn's mean motion for Centuries.

(For Centuries B.C. see p. 331.)

A.D.	Kaliyuga.	Mean Long at commencement of Solar Year	Longitude of apsis.	Longitude of node
		Deg.	Deg.	Deg.
1 B.C.	3101 K.Y.	70·5378	236·6194	100·4714
100 A.D.	3201	212·4447	236·6197	100·4659
200	3301	354·8517	236·6200	100·4604
300	3401	136·2586	236·6203	100·4548
400	3501	278·1655	236·6207	100·4493
500	3601	60·0725	236·6210	100·4438
600	3701	201·9794	236·6213	100·4383
700	3801	343·8864	236·6216	100·4328
800	3901	125·7933	236·6220	100·4272
900	4001	267·7002	236·6223	100·4217

A.D.	Kaliyuga.	Mean Long at commencement of Solar Year	Longitude of apsis.	Longitude of node.
		Deg.	Deg.	Deg.
1000 A.D.	4101 K.Y.	49·6072	236·6226	100·4162
1100	4201	191·5141	236·6229	100·4107
1200	4301	333·4211	236·6233	100·4052
1300	4401	115·3280	236·6236	100·3997
1400	4501	257·2349	236·6239	100·3941
1500	4601	39·1419	236·6242	100·3886
1600	4701	181·0488	236·6246	100·3831
1700	4801	322·9558	236·6249	100·3776
1800	4901	104·8627	236·6252	100·3721
1900	5001	246·7696	236·6255	100·3665
2000	5101	28·6766	236·6259	100·3611

TABLE IV—Saturn—*cont.*

Saturn's mean motion for Odd Years. (Used at p. 97 of Text.)

Yrs.	Deg	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.
1	12·22	**11**	131·41	**21**	256·60	**31**	18·79	**41**	140·98
2	24·44	**12**	146·63	**22**	268·82	**32**	31·01	**42**	153·20
3	36·66	**13**	158·85	**23**	281·04	**33**	43·23	**43**	165·42
4	48·88	**14**	171·07	**24**	293·26	**34**	55·45	**44**	177·64
5	61·09	**15**	183·29	**25**	305·48	**35**	67·67	**45**	189·86
6	73·31	**16**	195·50	**26**	317·70	**36**	79·89	**46**	202·08
7	85·53	**17**	207·72	**27**	329·91	**37**	92·10	**47**	214·30
8	97·75	**18**	219·94	**28**	342·13	**38**	104·32	**48**	226·51
9	109·97	**19**	232·16	**29**	354·35	**39**	116·54	**49**	238·73
10	122·19	**20**	244·38	**30**	6·57	**40**	128·76	**50**	250·95

Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg.	Yrs.	Deg	Yrs	Deg.
51	263·17	**61**	25·36	**71**	147·55	**81**	269·74	**91**	31·93
52	275·39	**62**	37·58	**72**	159·77	**82**	281·96	**92**	44·15
53	287·61	**63**	49·80	**73**	171·99	**83**	294·18	**93**	56·37
54	299·83	**64**	62·02	**74**	184·21	**84**	306·40	**94**	68·59
55	312·05	**65**	74·24	**75**	196·43	**85**	318·62	**95**	80·81
56	324·27	**66**	86·46	**76**	208·65	**86**	330·84	**96**	93·03
57	336·49	**67**	98·68	**77**	220·87	**87**	343·06	**97**	105·25
58	348·71	**68**	110·90	**78**	233·09	**88**	355·28	**98**	117·47
59	0·92	**69**	123·12	**79**	245·31	**89**	7·50	**99**	129·69
60	13·14	**70**	135·33	**80**	257·52	**90**	19·72	**100**	141·91

Saturn's mean motion for Days.

Days.	0	1	2	3	4	5	6	7	8	9
					Degrees.					
0	...	0.03	0·07	0·10	0·13	0·17	0·20	0·23	0·27	0·30
1	0·33	0·37	0·40	0·43	0·47	0·50	0·53	0·57	0·60	0·64
2	0·67	0·70	0·74	0·77	0·80	0·84	0·87	0·90	0·94	0·97
3	1·00	1·04	1·07	1·10	1·14	1·17	1·20	1·24	1·27	1·30
4	1·34	1·37	1·40	1·44	1·47	1·51	1·54	1·57	1·61	1·64
5	1·67	1·71	1·74	1·77	1·81	1·84	1·87	1·91	1·94	1·97
6	2·01	2·04	2·07	2·11	2·14	2·17	2·21	2·21	2·27	2·31
7	2·34	2·38	2·41	2·44	2·48	2·51	2·54	2·58	2·61	2·64
8	2·68	2·71	2·74	2·78	2·81	2·84	2·88	2·91	2·94	2·98
9	3·01	3·04	3·08	3·11	3·14	3·18	3·21	3·25	3·28	3·31
10	3·35	3·38	3·41	3·45	3·48	3·51	3·55	3·58	3·61	3·65
11	3·68	3·71	3·75	3·78	3·81	3·85	3·88	3·91	3·95	3·98
12	4·01	4·05	4·08	4·12	4·15	4·18	4·22	4·25	4·28	4·32
13	4·35	4·38	4·42	4·45	4·48	4·52	4·55	4·58	4·62	4·65
14	4·68	4·72	4·75	4·78	4·82	4·85	4·88	4·92	4·95	4·99
15	5·02	5·05	5·09	5·12	5·15	5·19	5·22	5·25	5·29	5·32
16	5·35	5·39	5·42	5·45	5·49	5·52	5·55	5·59	5·62	5·65
17	5·69	5·72	5·75	5·79	5·82	5·85	5·89	5·92	5·96	5·99
18	6·02	6·06	6·09	6·12	6·16	6·19	6·22	6·26	6·29	6·32

Days	0	1	2	3	4	5	6	7	8	9
					Degrees.					
19	6·36	6·39	6·42	6·46	6·49	6·52	6·56	6·59	6·62	6·66
20	6·69	6·72	6·76	6·79	6·83	6·86	6·89	6·93	6·96	6·99
21	7·03	7·06	7·09	7·13	7·16	7·19	7·23	7·26	7·29	7·33
22	7·36	7·39	7·43	7·46	7·49	7·53	7·56	7·59	7·63	7·66
23	7·70	7·73	7·76	7·80	7·83	7·86	7·90	7·93	7·96	8·00
24	8·03	8·06	8·10	8·13	8·16	8·20	8·23	8·26	8·29	8·33
25	8·36	8·40	8·43	8·46	8·50	8·53	8·57	8·60	8·63	8·67
26	8·70	8·73	8·77	8·80	8·83	8·87	8·90	8·93	8·97	9·00
27	9·03	9·07	9·10	9·13	9·17	9·20	9·23	9·27	9·30	9·33
28	9·37	9·40	9·43	9·47	9·50	9·54	9·57	9·60	9·64	9·67
29	9·70	9·74	9·77	9·80	9·84	9·87	9·90	9·94	9·97	10·00
30	10·04	10·07	10·10	10·14	10·17	10·20	10·24	10·27	10·31	10·34
31	10·37	10·41	10·44	10·47	10·51	10·54	10·57	10·61	10·64	10·67
32	10·71	10·74	10·77	10·81	10·84	10·87	10·91	10·94	10·97	11·01
33	11·04	11·07	11·11	11·14	11·18	11·21	11·24	11·28	11·31	11·34
34	11·38	11·41	11·44	11·48	11·51	11·54	11·58	11·61	11·64	11·68
35	11·71	11·74	11·78	11·81	11·84	11·88	11·91	11·94	11·98	12·01
36	12·05	12·08	12·11	12·15	12·18	12·21	...	.	...	

Saturn's Annual Equation. (Used at p. 97 of Text.)

+	·0	·1	·2	·3	·4	·5	·6	7	8	9
					Degrees					
0	0·0	1·0	2·0	3·1	4·1	5·1	6·1	7·1	8·2	9·2
1	10·2	11·2	12·2	13·3	14·4	15·4	16·4	17·5	18·5	19·6
2	20·6	21·7	22·7	23·8	24·9	26·0	27·1	28·2	29·2	30·4
3	31·5	32·6	33·7	34·9	36·1	37·2	38·4	39·6	40·8	42·0
4	43·2	44·5	45·9	47·1	48·5	49·7	51·1	52·5	54·0	55·5
5	57·0	58·5	60·1	61·7	63·5	65·4	67·2	69·2	71·5	73·7
6	76·2	79·8	82·7	87·5	97·5			.		.

−	0	1	·2	3	·4	·5	·6	7	·8	9
					Degrees					
0	180·0	180·8	181·7	182.5	183·3	184·1	184·9	185·8	186·6	187·4
1	188·3	189·1	189·9	190·8	191·6	192·4	193·3	194·1	194·9	195·8
2	196·7	197·5	198·4	199·4	200·8	201·1	201·9	202·8	203·8	204·7
3	205·6	206·5	207·5	208·4	209·4	210·3	211·3	212·3	213·3	214·4
4	215·4	216·5	217·5	218·7	219·8	221·0	222·1	223·4	224·6	225·9
5	227·3	2 8·5	229·8	231·3	233·0	234·6	236·3	238·3	240·0	242·3
6	244·3	247·3	250·8	255·0	262·5		..	..		

Maximum Equation 6·3767° for Anomaly of 97·50.

+	·9	8	·7	·6	·5	·4	·3	·2	1	·0
					Degrees					
6					..	97·5	105·0	109·2	112·7	115·7
5	117·7	120·0	121·7	123·7	125·4	127·0	128·7	130·2	131·5	132·7
4	134·1	135·4	136·6	137·9	139·0	140·2	141·3	142·5	143·5	144·6
3	145·6	146·7	147·7	148·7	149·7	150·6	151·6	152·5	153·5	154·4
2	155·3	156·2	157·2	158·1	158·9	159·2	160·7	161·6	162·5	163·3
1	164·2	165·1	165·9	166·7	167·6	168·4	169·2	170·1	170·9	171·7
0	172·6	173·4	174·2	175·1	175·9	176·7	177·5	178·3	179·2	180·0

Maximum Equation 6·3767 for Anomaly of 262·50

−	9	8	·7	6	·5	·4	·3	·2	·1	·0
					Degrees					
6						262·5	272·5	277·3	280·8	283·8
5	286·3	288·5	290·8	292·8	294·6	296·5	298·3	299·9	301·5	303·0
4	304·5	306·0	307·5	308·9	310·3	311·5	312·9	314·1	315·5	316·8
3	318·0	319·2	320·4	321·6	322·8	323·9	325·1	326·3	327·4	328·5
2	329·6	330·8	331·8	332·9	334·0	335·1	336·2	337·3	338·3	339·4
1	340·4	341·5	342·5	343·6	344·6	345·6	346·7	347·8	348·8	349·8
0	350·8	351·8	352·9	353·9	354·9	355·9	356·9	358·0	359·0	360·0

Saturn's Anomaly. (Used at p. 97 of Text.)

+	·0	1	·2	3	4	·5	·6	7	·8	·9
					Degrees.					
0	0·0	0·7	1·5	2·2	2·9	3·7	4·4	5·2	5·9	6·7
1	7·4	8·1	8·9	9·6	10·4	11·2	11·9	12·7	13·4	14·2
2	14·9	15·7	16·5	17·2	18·1	18·8	19·6	20·4	21·2	22·0
3	22·8	23·7	24·5	25·3	26·1	26·9	27·8	28·7	29·5	30·3
4	31·2	32·1	33·0	33·9	34·8	35·7	36·7	37·6	38·5	39·5
5	40·5	41·5	42·5	43·5	44·6	45·6	46·7	47·9	49·0	50·1
6	51·4	52·5	53·9	55·1	56·5	57·9	59·2	60·9	62·5	64·1
7	66·0	67·7	70·0	72·2	75·0	78·2	83·0	90·0	.	.

−	·0	·1	·2	3	·4	·5	·6	·7	·8	·9
					Degrees.					
0	180·0	180·7	181·5	182·2	182·9	183·7	184·4	185·2	185·9	186·7
1	187·4	188·1	188·9	189·6	190·4	191·2	191·9	192·7	193·4	194·2
2	194·9	195·7	196·5	197·2	198·1	198·8	199·6	200·4	201·2	202·0
3	202·8	203·7	204·5	205·3	206·1	206·9	207·8	208·7	209·5	210·3
4	211·2	212·1	213·0	213·9	214·8	215·7	216·7	217·6	218·5	219·5
5	220·5	221·5	222·5	223·5	224·6	225·6	226·7	227·9	229·0	230·1
6	231·4	232·5	233·9	235·1	236·5	237·9	239·2	240·9	242·5	244·1
7	246·0	247·7	250·0	252·2	255·0	258·2	263·0	270·0	..	.

Maximum Equation 7·6586 for Anomaly of 90·00°.

+	·9	8	·7	·6	5	·4	·3	2	·1	·0
					Degrees.					
7			90·0	97·0	101·8	105·0	107·8	110·0	112·3	114·0
6	115·9	117·5	119·1	120·8	122·1	123·5	124·9	126·1	127·5	128·6
5	129·9	131·0	132·1	133·3	134·4	135·4	136·5	137·5	138·5	139·5
4	140·5	141·5	142·4	143·3	144·3	145·2	146·1	147·0	147·9	148·8
3	149·7	150·5	151·3	152·2	153·1	153·9	154·7	155·5	156·3	157·2
2	158·0	158·8	159·6	160·4	161·2	161·9	162·8	163·5	164·3	165·1
1	165·8	166·6	167·3	168·1	168·8	169·6	170·4	171·1	171·9	172·6
0	173·3	174·1	174·8	175·6	176·3	177·1	177·8	178·5	179·3	180·0

Maximum Equation 7·6586° for Anomaly of 270·00°.

−	·9	·8	·7	·6	·5	·4	3	·2	·1	·0
					Degrees.					
7			270·0	277·0	281·8	285·0	287·8	290·0	292·3	294·0
6	295·9	297·5	299·1	300·8	302·1	303·5	304·9	306·1	307·5	308·6
5	309·9	311·0	312·1	313·3	314·4	315·4	316·5	317·5	318·5	319·5
4	320·5	321·5	322·4	323·3	324·3	325·2	326·1	327·0	327·9	328·8
3	329·7	330·5	331·3	332·2	333·1	333·9	334·7	335·5	336·3	337·2
2	338·0	338·8	339·6	340·4	341·2	341·9	342·8	343·5	344·3	345·1
1	345·8	346·6	347·3	348·1	348·8	349·6	350·4	351·1	351·9	352·6
0	353·3	354·1	354·8	355·6	356·3	357·1	357·8	358·5	359·3	360·0

TABLE IV—Mars eye-table.

Mean longitude of Mars, corresponding to Mars' actual place for every tenth day in a year and vice versa—vide paragraph 320 of "Indian Chronology" (2nd edition) or Volume I of Indian Ephemeris, A D. 700 to A D 2000.

Mean longitude (Degrees).

Actual geocentric place.	0 dy	10 dys.	20 dys.	30 dys.	40 dys.	50 dys.	60 dys.	70 dys.	80 dys.	90 dys.	100 dys	110 dys	120 dys	130 dys.	140 dys	150 dys.	160 dys.	170 dys	180 dys
0°	354	347	341	335	330	325	321	317	314	314	314	315	320	323	328	331	339	344	350
10°	9	2	356	350	343	338	334	329	325	324	322	322	325	327	331	336	342	347	353
20°	23	17	12	5	358	352	347	342	338	335	332	331	332	333	335	339	344	350	356
30°	39	33	26	21	14	9	2	356	351	347	344	341	340	340	342	344	349	353	359
40°	49	48	43	36	30	24	18	11	5	1	357	351	351	349	349	350	354	358	3
50°	70	65	59	53	47	42	35	28	21	16	11	6	3	0	358	358	1	3	8
60°	86	80	75	70	63	57	52	43	38	31	26	20	16	11	10	7	9	10	13
70°	100	98	92	87	80	75	69	61	55	50	41	37	33	26	22	19	18	18	21
80°	114	112	108	104	98	92	86	79	72	66	59	53	47	42	37	33	31	29	29
90°	128	126	122	120	115	111	104	98	91	85	77	69	64	57	53	48	45	41	40
100°	136	139	138	135	132	128	124	116	109	104	95	89	82	75	70	64	59	55	52
110°	146	148	150	150	147	145	140	134	128	122	115	108	102	94	89	81	77	71	68
120°	155	158	161	162	161	161	157	152	147	141	133	127	120	113	106	99	94	87	84
130°	162	167	171	172	174	174	171	169	164	159	153	146	140	133	125	116	112	106	101
140°	169	174	179	182	185	187	186	183	180	177	172	165	159	152	145	137	131	122	119
150°	175	181	186	190	194	197	197	197	195	193	188	183	178	171	164	157	150	143	137
160°	180	186	192	197	202	206	208	209	217	207	204	200	196	189	183	176	170	163	156
170°	185	191	197	203	208	214	217	219	220	220	218	214	211	205	201	194	187	182	175
180°	189	195	202	208	213	220	224	227	230	231	231	229	226	222	211	212	207	200	193
190°	193	199	205	211	217	224	229	233	236	241	241	241	240	237	233	227	223	219	211
200°	196	202	209	216	222	229	234	239	244	248	249	251	251	250	247	242	238	232	228
210°	200	207	213	219	225	232	238	244	248	254	257	260	260	261	259	256	253	248	243
220°	206	211	217	223	229	236	242	247	253	259	273	266	270	271	269	268	267	262	259
230°	211	216	221	226	232	239	245	250	256	263	267	272	276	278	280	279	278	276	273
240°	217	220	225	230	235	242	248	254	259	265	271	276	281	285	287	288	289	286	285
250°	223	226	230	234	239	245	251	256	262	269	274	280	285	290	293	295	297	297	296
260°	231	233	235	238	243	249	254	259	265	272	277	283	284	294	298	301	305	306	306
270°	240	240	241	244	247	252	257	262	268	274	280	286	293	297	302	306	310	313	315
280°	250	249	249	250	252	256	261	265	270	277	283	288	295	300	306	309	315	319	321
290°	260	258	257	257	258	261	265	269	274	280	285	291	298	303	309	314	319	323	327
300°	272	268	267	265	265	267	270	273	277	283	288	293	300	306	311	317	323	327	332
310°	284	280	276	273	273	274	275	278	281	286	291	296	302	308	314	319	326	331	336
320°	297	292	288	284	282	281	282	283	286	290	294	299	305	311	316	322	328	334	340
330°	311	305	299	295	291	291	289	280	291	295	298	302	308	313	319	324	331	335	343
340°	324	317	313	308	304	301	298	297	298	300	303	306	311	318	321	327	333	339	346
350°	339	331	327	322	316	313	309	307	305	306	307	310	315	319	324	330	336	342	348

Mean longitude (Degrees).

Actual geocentric place.	190 dys	200 dys.	210 dys.	220 dys.	230 dys.	240 dys.	250 dys	260 dys.	270 dys	280 dys.	290 dys.	300 dys.	310 dys.	320 dys.	330 dys	340 dys.	350 dys.	360 dys.
0°	357	3	9	14	19	24	27	30	31	31	30	27	23	18	15	8	2	356
10°	359	5	11	17	22	28	32	35	39	40	41	39	31	32	29	23	18	12
20°	2	8	14	19	25	32	37	41	44	47	50	50	42	46	43	38	33	26
30°	5	11	17	23	29	35	41	46	50	54	58	59	60	58	57	52	48	42
40°	8	15	20	26	32	39	45	50	55	60	65	68	69	69	69	67	63	58
50°	12	18	23	29	35	42	48	54	60	66	71	75	78	79	80	79	77	73
60°	17	22	27	33	39	46	52	58	65	70	77	82	86	89	91	91	90	87
70	23	28	32	37	43	50	56	62	69	74	82	88	93	97	101	103	103	101
80	31	34	38	42	47	54	60	66	73	79	87	93	99	104	109	112	114	114
90	40	42	44	48	52	58	65	70	79	84	92	98	105	110	117	121	124	126
100°	51	52	53	55	60	64	70	75	82	89	98	103	110	117	124	129	133	137
110°	61	63	63	64	66	71	75	81	87	93	101	108	115	122	130	136	141	145
120°	80	77	75	74	75	79	83	87	92	99	107	113	120	128	135	143	148	153
130	96	92	89	87	86	88	91	94	99	104	112	119	127	133	141	148	154	160
140°	112	109	104	100	99	99	101	103	107	111	118	124	131	139	146	153	160	166
150°	129	125	120	116	113	111	112	112	117	119	125	131	137	144	152	159	166	172
160°	149	144	137	132	128	125	125	123	124	128	132	137	143	149	157	163	170	177
170	168	162	155	149	143	141	138	135	135	136	140	144	149	155	162	168	175	182
180	186	180	173	167	160	156	153	149	148	147	149	152	156	160	167	173	180	186
190	205	199	191	186	178	174	168	163	160	159	159	161	163	167	173	178	184	190
200°	221	216	209	202	195	190	184	180	175	171	170	170	172	174	179	184	189	195
210°	239	233	227	219	213	207	201	194	190	186	182	181	181	188	186	190	194	199
220°	253	248	243	236	230	224	217	211	205	199	196	193	192	191	195	195	200	204
230	269	263	257	251	246	239	234	227	222	215	211	207	204	202	202	203	205	210
240	281	278	272	266	260	257	249	243	237	231	226	221	217	214	212	212	213	215
250°	294	291	286	282	275	270	267	258	252	245	241	236	230	226	224	222	217	222
260°	305	302	299	295	286	284	279	272	267	261	256	250	244	240	237	233	231	231
270°	315	314	311	308	303	299	293	287	281	277	271	265	259	253	249	245	242	240
280	323	324	322	319	315	312	307	301	306	289	285	279	273	267	263	258	254	251
390°	330	332	331	330	327	323	320	315	309	304	298	293	287	281	276	271	266	262
300°	335	339	340	339	388	336	332	328	322	318	312	303	302	295	290	285	279	274
310°	340	344	346	348	347	347	344	340	336	331	326	320	315	308	304	298	292	287
320	344	349	353	355	356	357	355	353	348	342	340	334	328	322	317	312	306	300
330°	348	352	358	1	3	5	4	3	0	356	353	348	342	337	331	325	319	314
340	351	357	2	6	9	12	13	13	12	8	6	1	356	350	346	339	333	328
350	353	359	4	9	14	18	21	23	22	20	19	14	10	4	0	354	348	341

TABLE IV—Mercury eye-table.

Showing for every tenth day in the Indian Solar year

(1) in ordinary type, the mean longitude of Mercury for that day (indicated by M.L.) attained in a particular year—shown in Column 1. See explanation in paragraph 321, page 132 of the Text

(2) in heavy type, the corresponding actual geocentric place (indicated by G.P.) extracted from Table V-B.

N.B.—When using this table find first of all, under the appropriate day of the solar year, the place where the minimum mean longitude for that column, 1, 2, 3, 4, 5, etc., as the case may be, is entered in ordinary type, from this point any other desired longitude may be traced consecutively. Supposing it is required to know the actual geocentric place of Mercury corresponding to mean longitude 13° on the 90th (completed) day of any solar year. Looking down the column "90 days" it will be found that the initial mean longitude 5° is entered in line with 1857 mean longitude in column 3. Running the eye along the column "90 days", the mean longitude 13 is the next entry for which the corresponding geocentric place is 71 (11 in Mithuna)

Year		0 dy	10 dys	20 dys	30 dys	40 dys.	50 dys.	60 dys	70 dys.	80 dys	90 dys.	100 dys.	110 dys	120 dys	130 dys	140 dys	150 dys	160 dys	170 dys	180 dys	190 dys	200 dys	210 dys	220 dys	230 dys	240 dys	250 dys	260 dys
		Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.
A.D.	M.L.	200	241	282	323	4	45	86	126	167	208	249	290	331	12	53	94	135	176	217	258	298	339	20	61	102	143	184
1834	G.P.	**342**	**343**	**355**	**10**	**28**	**47**	**66**	**84**	**100**	**112**	**116**	**111**	**105**	**109**	**120**	**136**	**153**	**170**	**188**	**204**	**217**	**225**	**224**	**216**	**214**	**221**	**235**
	M.L.	208	249	290	331	12	53	94	134	175	216	257	298	339	20	61	102	143	184	225	266	306	347	28	69	120	151	192
1821	G.P.	**338**	**343**	**355**	**12**	**30**	**49**	**68**	**86**	**101**	**111**	**113**	**106**	**103**	**109**	**121**	**138**	**155**	**173**	**190**	**205**	**218**	**224**	**219**	**211**	**213**	**223**	**237**
	M.L.	216	257	298	339	20	61	102	142	183	224	265	306	347	28	69	110	151	192	233	274	314	355	36	77	118	159	200
1808	G P	**336**	**343**	**356**	**14**	**32**	**51**	**70**	**87**	**101**	**110**	**109**	**102**	**101**	**109**	**123**	**139**	**157**	**175**	**192**	**207**	**217**	**221**	**215**	**209**	**212**	**224**	**239**
	M L.	224	265	306	347	28	69	110	150	191	232	273	314	355	36	77	118	159	200	241	282	322	3	44	85	126	167	208
1795	G.P.	**334**	**343**	**358**	**16**	**34**	**53**	**72**	**89**	**102**	**108**	**104**	**98**	**99**	**110**	**124**	**141**	**159**	**177**	**194**	**208**	**217**	**217**	**210**	**206**	**213**	**225**	**240**
	M.L.	231	272	313	354	35	76	117	157	198	239	280	321	2	43	84	125	166	207	248	289	329	10	51	92	133	174	215
1828	G.P.	**332**	**344**	**359**	**17**	**36**	**55**	**74**	**90**	**102**	**106**	**100**	**95**	**99**	**111**	**126**	**143**	**161**	**180**	**195**	**208**	**216**	**214**	**207**	**205**	**213**	**226**	**242**
	M.L.	239	280	321	2	43	84	125	165	206	247	288	329	10	51	92	133	174	215	256	297	337	18	59	100	141	182	223
1815	G.P.	**333**	**345**	**1**	**20**	**38**	**57**	**75**	**90**	**101**	**102**	**95**	**92**	**99**	**111**	**128**	**145**	**163**	**181**	**196**	**209**	**214**	**210**	**203**	**204**	**213**	**228**	**244**
	M.L	247	288	329	10	51	92	133	173	214	255	296	337	18	59	100	141	182	223	264	305	345	26	67	108	149	190	231
1802	G.P	**333**	**346**	**3**	**22**	**41**	**59**	**77**	**91**	**99**	**98**	**91**	**90**	**99**	**113**	**130**	**147**	**165**	**182**	**197**	**208**	**212**	**206**	**200**	**203**	**214**	**229**	**246**
	M.L.	251	295	336	17	58	99	140	180	221	262	303	344	25	66	107	148	189	230	271	312	352	33	74	115	156	197	238
1835	G.P	**333**	**348**	**5**	**24**	**43**	**61**	**78**	**91**	**98**	**94**	**88**	**89**	**100**	**114**	**132**	**149**	**167**	**184**	**198**	**208**	**209**	**202**	**198**	**203**	**215**	**231**	**248**
	M.L	263	304	345	26	67	108	149	189	230	271	312	353	34	75	116	157	198	239	280	321	1	42	83	124	165	206	247
1822	G P.	**339**	**349**	**7**	**26**	**45**	**63**	**79**	**91**	**95**	**89**	**84**	**89**	**101**	**116**	**133**	**151**	**169**	**185**	**199**	**207**	**206**	**198**	**196**	**204**	**217**	**233**	**250**
	M.L	271	312	353	34	75	116	157	197	238	279	320	1	42	83	124	165	206	247	288	329	9	50	91	132	173	214	255
1809	G P.	**335**	**351**	**9**	**28**	**48**	**65**	**80**	**90**	**92**	**85**	**81**	**88**	**102**	**118**	**136**	**154**	**171**	**187**	**199**	**205**	**201**	**194**	**195**	**204**	**218**	**235**	**252**
	M.L.	279	320	1	42	83	124	165	205	246	287	328	9	50	91	132	173	214	255	296	337	17	58	99	140	181	222	263
1796	G.P.	**336**	**353**	**11**	**30**	**49**	**66**	**80**	**89**	**87**	**80**	**80**	**89**	**103**	**120**	**138**	**156**	**173**	**188**	**199**	**203**	**197**	**191**	**194**	**205**	**220**	**237**	**254**
	M.L.	286	327	8	49	90	131	172	212	253	294	335	16	57	98	139	180	221	262	303	344	24	65	106	147	188	229	270
1829	G P	**337**	**355**	**13**	**32**	**51**	**67**	**81**	**87**	**83**	**77**	**79**	**89**	**104**	**122**	**140**	**158**	**174**	**189**	**199**	**200**	**193**	**189**	**195**	**206**	**221**	**239**	**256**
	M L	294	335	16	57	98	139	180	220	261	302	343	24	65	106	147	188	229	270	311	352	32	73	114	155	196	237	278
1816	G P	**339**	**357**	**15**	**34**	**53**	**69**	**80**	**84**	**78**	**73**	**78**	**90**	**106**	**124**	**142**	**160**	**176**	**190**	**198**	**196**	**189**	**187**	**195**	**208**	**224**	**241**	**258**
	M.L.	302	343	24	65	106	147	188	228	269	310	351	32	73	114	155	196	237	278	319	0	40	81	122	163	204	245	286
1803	G P.	**341**	**359**	**18**	**36**	**54**	**69**	**79**	**80**	**74**	**71**	**79**	**92**	**108**	**125**	**144**	**161**	**177**	**190**	**196**	**193**	**185**	**186**	**195**	**209**	**226**	**243**	**260**
	M.L.	309	350	31	72	113	154	195	235	276	317	358	39	80	121	162	203	244	285	326	7	47	88	129	170	211	252	293
1836	G.P.	**343**	**1**	**20**	**38**	**56**	**70**	**78**	**77**	**70**	**69**	**79**	**93**	**110**	**126**	**146**	**163**	**179**	**190**	**194**	**189**	**182**	**185**	**196**	**211**	**227**	**245**	**262**
	M.L.	317	358	39	80	121	162	203	243	284	325	6	47	88	129	170	211	252	293	334	15	55	96	137	178	219	260	301
1823	G P.	**345**	**3**	**22**	**40**	**57**	**70**	**76**	**72**	**66**	**68**	**79**	**94**	**112**	**130**	**148**	**165**	**180**	**189**	**191**	**184**	**180**	**185**	**197**	**213**	**229**	**247**	**264**
	M.L.	325	6	47	88	129	170	211	251	292	333	14	55	96	137	178	219	260	301	342	23	63	104	145	186	227	268	309
1810	G.P.	**347**	**5**	**24**	**42**	**58**	**70**	**73**	**67**	**62**	**68**	**80**	**96**	**114**	**132**	**150**	**166**	**180**	**188**	**187**	**180**	**178**	**186**	**198**	**215**	**231**	**244**	**266**
	M.L.	334	15	56	97	138	179	220	260	301	342	23	64	105	146	187	228	269	310	351	32	72	113	154	195	236	277	318
1797	G.P.	**349**	**8**	**26**	**44**	**59**	**69**	**70**	**63**	**60**	**68**	**81**	**98**	**116**	**134**	**152**	**167**	**181**	**187**	**185**	**176**	**177**	**186**	**200**	**216**	**234**	**251**	**268**
	M.L.	341	22	63	104	145	186	227	267	308	349	30	71	112	153	194	235	276	317	358	39	79	120	161	202	243	284	325
1830	G P.	**351**	**10**	**28**	**45**	**59**	**67**	**66**	**59**	**59**	**69**	**83**	**100**	**118**	**136**	**153**	**169**	**181**	**184**	**179**	**173**	**176**	**187**	**202**	**218**	**236**	**253**	**269**
	M.L.	349	30	71	112	153	194	235	275	316	357	38	79	120	161	202	243	284	325	6	47	87	128	169	210	251	292	333
1817	G P.	**353**	**12**	**30**	**47**	**60**	**65**	**61**	**55**	**58**	**89**	**84**	**102**	**100**	**138**	**155**	**170**	**180**	**182**	**175**	**171**	**176**	**188**	**203**	**220**	**238**	**255**	**270**
	M.L.	357	38	79	120	161	202	243	283	324	5	46	87	128	169	210	251	292	333	14	55	95	136	177	218	259	300	341
1804	G.P.	**355**	**14**	**32**	**47**	**59**	**62**	**56**	**52**	**57**	**70**	**86**	**104**	**122**	**141**	**157**	**171**	**179**	**178**	**171**	**168**	**176**	**189**	**205**	**222**	**240**	**256**	**271**

Year		270 dys	280 dys	290 dys	300 dys	310 dys	320 dys	330 dys	340 dys	350 dys	360 dys
		Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.
A.D.		225	266	307	348	29	70	110	151	192	233
1835		**251**	**269**	**287**	**304**	**319**	**330**	**333**	**328**	**322**	**327**
		233	274	315	356	37	78	118	159	200	241
1822		**253**	**271**	**289**	**305**	**320**	**329**	**330**	**323**	**320**	**327**
		241	282	323	4	45	86	126	167	208	249
1809		**256**	**273**	**291**	**307**	**320**	**328**	**326**	**319**	**318**	**327**
		249	290	331	12	53	94	134	175	216	257
1796		**258**	**275**	**293**	**308**	**320**	**326**	**321**	**315**	**317**	**328**
		256	297	338	19	60	101	144	182	223	264
1829		**259**	**277**	**294**	**309**	**320**	**323**	**317**	**312**	**317**	**329**
		264	305	346	27	68	109	149	190	231	272
1816		**262**	**279**	**296**	**310**	**319**	**320**	**313**	**310**	**317**	**330**
		272	313	354	35	76	117	157	198	239	280
1803		**264**	**281**	**297**	**310**	**318**	**316**	**309**	**308**	**318**	**332**
		279	320	1	42	83	124	164	205	246	287
1836		**265**	**283**	**298**	**311**	**316**	**312**	**306**	**307**	**318**	**333**
		288	329	10	51	92	133	173	214	255	296
1823		**268**	**284**	**299**	**310**	**313**	**307**	**302**	**307**	**319**	**335**
		296	337	18	59	100	141	181	222	263	304
1810		**270**	**286**	**300**	**309**	**310**	**303**	**300**	**307**	**320**	**337**
		304	345	26	67	108	149	189	230	271	312
1797		**272**	**288**	**301**	**308**	**305**	**298**	**298**	**307**	**322**	**339**
		311	352	33	74	115	156	196	237	278	319
1830		**273**	**289**	**301**	**306**	**301**	**295**	**298**	**308**	**323**	**341**
		319	0	41	82	123	164	204	245	286	327
1817		**275**	**290**	**301**	**303**	**297**	**292**	**297**	**309**	**325**	**343**
		327	8	49	90	131	172	212	253	294	335
1804		**277**	**291**	**300**	**300**	**293**	**290**	**297**	**310**	**327**	**345**
		334	15	56	97	138	179	219	260	301	342
1837		**278**	**291**	**298**	**296**	**289**	**288**	**298**	**311**	**329**	**347**
		342	23	64	105	146	187	227	268	309	350
1824		**279**	**291**	**296**	**292**	**285**	**288**	**298**	**313**	**331**	**349**
		350	31	72	113	154	195	235	276	317	358
1811		**281**	**291**	**294**	**287**	**282**	**287**	**299**	**315**	**333**	**351**
		359	40	81	122	163	204	244	285	326	7
1798		**281**	**290**	**290**	**283**	**280**	**287**	**301**	**317**	**335**	**354**
		6	47	88	129	170	211	251	292	333	14
1831		**282**	**289**	**287**	**279**	**279**	**288**	**302**	**319**	**337**	**356**
		14	55	96	137	178	219	259	300	341	22
1818		**282**	**286**	**282**	**276**	**278**	**288**	**303**	**321**	**339**	**358**
		22	63	104	145	186	227	267	308	349	30
1805		**281**	**284**	**278**	**273**	**277**	**290**	**305**	**323**	**341**	**360**

TABLE IV—Mercury eye table—*cont.*

Showing for every tenth day in the Indian Solar year, etc.—*cont.*

Year A.D.		0 dy.	10 dys.	20 dys	30 dys	40 dys	50 dys.	60 dys.	70 dys	80 dys	90 dys	100 dys	110 dys	120 dys	130 dys	140 dys	150 dys	160 dys.	170 dys.	180 dys	190 dys.	200 dys	210 dys	220 dys	230 dys	240 dys	250 dys.	260 dys		270 dys	280 dys	290 dys.	300 dys.	310 dys.	320 dys	330 dys.	340 dys.	350 dys.	360 dys.
	M.L.	5	46	87	128	169	210	251	291	332	13	54	95	136	177	218	259	300	341	22	63	103	144	185	226	267	308	349		30	71	112	153	194	235	275	316	357	38
1791	G.P.	357	15	33	48	58	58	51	49	57	71	88	106	125	142	158	171	177	174	167	167	177	191	207	225	242	258	272	**1792**	280	281	273	271	278	291	307	325	344	2
	M.L.	12	53	94	135	176	217	258	298	339	20	61	102	143	184	225	266	307	348	29	70	110	151	192	233	274	315	356		37	78	119	160	201	242	282	323	4	45
1824	G.P	359	18	35	49	56	55	48	48	58	73	90	108	126	144	160	171	175	170	164	167	178	192	209	226	244	259	272	**1825**	279	277	270	269	278	292	309	327	345	4
	M.L.	20	61	102	143	184	225	266	306	347	28	69	110	151	192	233	274	315	356	37	78	118	159	200	241	282	323	4		45	86	127	168	209	250	290	331	12	53
1811	G.P	1	20	36	48	54	50	44	47	58	74	92	110	128	146	161	171	172	166	161	167	179	194	211	229	245	261	272	**1812**	277	273	266	268	279	294	311	329	348	5
	M.L.	28	69	110	151	192	233	274	314	355	36	77	118	159	200	241	282	323	364	45	86	126	167	208	249	290	331	12		53	94	135	176	217	258	298	339	20	61
1798	G.P	4	21	37	48	51	45	41	46	59	76	94	112	131	147	161	169	169	162	154	167	180	196	213	231	247	262	272	**1799**	274	268	263	268	280	296	313	332	350	7
	M.L.	35	76	117	158	199	240	281	321	2	43	84	125	166	207	248	289	330	11	52	93	133	174	215	256	297	338	19		60	101	142	183	224	265	305	346	27	68
1831	G.P.	6	23	38	47	48	41	39	46	61	78	96	114	132	149	162	168	165	158	158	167	182	198	215	232	249	263	271	**1832**	272	264	262	268	281	297	315	334	352	8
	M.L.	44	85	126	167	208	249	290	330	11	52	93	134	175	216	257	298	339	20	61	102	142	183	224	265	306	347	28		69	110	151	192	233	274	314	355	36	77
1818	G.P	7	24	38	46	43	36	37	47	62	80	98	116	134	150	162	166	161	154	158	168	183	200	217	234	250	263	270	**1819**	268	260	260	268	282	299	317	336	353	9
	M.L	52	93	134	175	216	257	298	338	19	60	101	142	183	224	265	306	347	28	69	110	150	191	232	273	314	355	36		77	118	159	200	241	282	322	363	44	85
1805	G.P	9	26	38	43	38	33	36	48	64	82	100	119	136	151	161	163	156	152	157	170	185	202	219	236	251	263	269	**1806**	264	257	259	269	284	301	319	338	355	10
	M.L	60	101	142	183	224	265	306	346	27	68	109	150	191	232	273	314	355	36	77	118	158	199	240	281	322	3	44		85	126	167	208	249	290	330	11	52	93
1792	G.P.	11	27	37	40	33	30	36	49	66	84	102	121	138	152	159	159	152	150	157	171	187	204	222	238	253	263	265	**1793**	259	254	259	270	286	303	322	340	357	11
	M.L.	67	108	149	190	231	272	313	353	34	75	116	157	198	239	280	321	2	43	84	125	165	206	247	288	329	10	51		92	133	174	215	256	297	337	18	59	100
1825	G.P	12	27	37	36	29	28	36	50	68	86	104	122	139	152	158	156	148	149	158	172	189	206	223	240	253	262	262	**1826**	255	252	260	271	287	305	323	341	358	12
	M.L.	75	116	157	198	239	280	321	1	42	83	124	165	206	247	288	329	10	51	92	133	173	214	255	296	337	18	59		100	141	182	223	264	305	345	26	67	108
1812	G.P.	14	27	34	32	25	26	36	52	69	88	106	124	140	152	156	151	145	148	159	174	191	208	225	241	254	261	259	**1813**	251	251	259	273	290	307	326	343	359	11
	M.L.	83	124	165	206	247	288	329	9	50	91	132	173	214	255	296	337	18	59	100	141	181	222	263	304	345	26	67		108	149	190	231	272	313	353	34	75	116
1799	G.P.	15	27	32	26	21	25	37	53	71	90	109	126	141	151	153	146	142	148	160	176	193	210	227	242	254	259	254	**1800**	248	250	260	275	292	310	328	345	0	11
	M.L.	90	131	172	213	254	295	336	16	57	98	139	180	221	262	303	344	25	66	107	148	188	229	270	311	352	33	74		115	156	197	238	279	320	0	41	82	123
1832	G.P	16	27	29	22	19	25	38	55	73	92	110	127	142	150	150	142	140	148	161	177	195	212	228	243	254	256	250	**1833**	245	249	261	276	293	312	329	346	1	9
	M.L	98	139	180	221	262	303	344	24	65	106	147	188	229	270	311	352	33	74	115	156	196	237	278	319	0	41	82		123	164	205	246	287	328	8	49	90	131
1819	G.P.	17	26	25	18	17	25	40	57	76	94	112	129	142	148	146	138	137	148	163	179	197	214	230	244	253	253	246	**1820**	243	249	262	278	296	314	332	348	1	7
	M.L	106	147	188	229	270	311	352	32	73	114	155	196	237	278	319	0	41	82	123	164	204	245	286	327	8	49	90		131	172	213	254	295	336	16	57	98	139
1806	G.P	17	24	20	14	15	26	41	59	78	96	114	130	142	146	141	135	138	149	164	181	199	216	232	245	252	250	242	**1807**	241	250	263	280	297	316	333	349	1	5
	M.L.	115	156	197	238	279	320	1	41	82	123	164	205	246	287	328	9	50	91	132	173	213	254	295	336	17	58	99		140	181	222	263	304	345	25	66	107	148
1793	G.P.	16	21	16	10	14	27	43	61	80	99	116	131	142	143	137	132	138	151	166	183	201	218	233	245	250	245	239	**1794**	240	251	266	282	300	318	335	350	0	1
	M.L.	122	163	204	245	286	327	8	48	89	130	171	212	253	294	335	16	57	98	139	180	220	261	302	343	24	65	106		147	188	229	270	311	352	32	73	114	155
1826	G.P	16	18	11	8	15	28	45	63	82	101	118	132	140	140	133	131	139	152	168	185	203	219	234	245	247	241	236	**1827**	240	251	267	284	302	320	336	350	359	358
	M.L	130	171	212	253	294	335	16	56	97	138	179	220	261	302	343	24	65	106	147	188	228	269	310	351	32	73	114		155	196	237	278	319	0	40	81	122	163
1813	G.P	14	14	7	6	15	29	47	65	84	102	119	132	139	136	129	129	139	153	170	186	205	221	235	244	244	237	234	**1814**	240	253	268	286	304	322	338	351	356	354
	M.L	138	179	220	261	302	343	24	64	105	146	187	228	269	310	351	32	73	114	155	196	236	277	318	359	40	81	122		163	204	245	286	327	8	48	89	130	171
1800	G.P.	13	10	3	5	16	31	49	68	87	104	120	132	136	131	125	129	140	155	171	189	207	223	236	242	241	233	232	**1801**	240	254	270	288	306	323	339	350	354	348
	M.L	145	186	227	268	309	350	31	71	112	153	194	235	276	317	358	39	80	121	162	203	243	284	325	6	47	88	129		170	211	252	293	334	15	55	96	137	178
1833	G.P.	10	5	360	4	16	32	51	69	88	105	121	132	133	127	123	129	141	157	173	191	209	224	236	241	237	230	231	**1834**	241	255	272	290	308	325	340	350	351	344
	M.L	153	194	235	276	317	358	39	79	120	161	202	243	284	325	6	47	88	129	170	211	251	292	323	14	55	96	137		178	219	260	301	342	23	63	104	145	186
1820	G.P	7	0	357	4	17	34	53	72	90	107	122	130	130	123	121	129	142	159	176	193	210	225	236	238	233	227	231	**1821**	242	257	274	292	310	327	340	348	347	340
	M.L.	161	202	243	284	325	6	47	87	128	169	210	251	292	333	14	55	96	137	178	219	259	300	341	22	63	104	145		186	227	268	309	350	31	71	112	153	194
1807	G.P	3	355	355	4	19	36	54	74	92	109	122	129	125	118	120	129	144	161	178	195	212	226	235	235	228	224	230	**1808**	243	259	277	294	312	328	340	346	342	336
	M.L.	169	210	251	292	333	14	55	95	136	177	218	259	300	341	22	63	104	145	186	227	267	308	349	30	71	112	153		194	235	276	317	358	39	79	120	161	202
1994	G.P	358	352	354	5	20	38	57	76	94	110	121	126	121	115	119	130	145	162	180	197	213	226	234	232	225	223	231	**1995**	245	261	279	296	314	329	340	344	338	333
	M.L.	176	217	258	299	340	21	62	102	143	184	225	266	307	348	29	70	111	152	193	234	274	315	356	37	78	119	160		201	242	283	324	5	46	86	127	168	209
1827	G.P.	354	349	353	6	22	40	59	78	96	111	121	123	117	113	119	131	147	164	182	199	215	227	232	228	221	222	232	**1828**	246	263	281	298	315	330	339	340	334	331
	M.L	184	225	266	307	348	29	70	110	151	192	233	274	315	356	37	78	119	160	201	242	282	323	4	45	86	127	168		209	250	291	332	13	54	94	135	176	217
1814	G.P	349	346	353	7	24	42	61	80	97	112	120	119	112	111	119	132	149	166	184	201	216	227	230	223	218	222	233	**1815**	248	265	283	300	317	330	338	337	329	329
	M.L	193	234	275	316	357	38	79	119	160	201	242	283	324	5	46	87	128	169	210	251	291	332	13	54	95	136	177		218	259	300	341	22	63	103	144	185	226
1801	G.P.	345	344	353	8	26	45	64	82	99	112	118	115	108	109	120	134	151	169	186	203	217	226	227	219	216	222	234	**1802**	250	267	285	302	318	330	336	332	325	327

TABLE IV—Jupiter eye-table.

Showing for every ten days in the Indian solar year the mean longitude of Jupiter corresponding to the actual geocentric place, entered in heavy type in column 1. (Text page 132.)

Mean longitude

Actual geocentric place	0 dy. Degrees.	10 dys. Degrees.	20 dys. Degrees.	30 dys. Degrees.	40 dys Degrees.	50 dys Degrees.	60 dys. Degrees.	70 dys Degrees.	80 dys Degrees.	90 dys Degrees.	100 dys Degrees.	110 dys Degrees.	120 dys Degrees.	130 dys Degrees.	140 dys Degrees.	150 dys Degrees.	160 dys Degrees.	170 dys Degrees.	180 dys Degrees.
0°	0	358	356	355	353	351	349	349	348	348	348	348	349	350	352	353	354	357	358
10°	11	9	7	5	3	2	0	359	358	358	357	356	357	358	359	2	2	3	5
20°	21	20	18	17	14	12	10	9	8	8	6	6	6	7	8	8	9	11	13
30°	33	31	29	27	23	23	22	21	19	18	16	15	15	16	17	17	18	19	20
40°	43	42	40	39	36	35	33	31	30	28	26	26	26	25	25	24	26	27	29
50°	55	53	51	50	48	46	44	43	41	40	38	35	35	35	35	35	35	35	36
60°	64	64	63	62	59	58	56	55	52	51	48	47	46	45	45	44	41	44	45
70°	76	75	75	73	71	69	67	66	64	63	60	58	57	56	55	55	53	54	54
80°	86	86	85	84	84	81	79	77	75	74	71	70	68	67	66	65	64	63	63
90°	96	97	97	95	93	92	91	90	88	86	84	82	80	78	77	76	74	74	73
100°	106	107	107	107	105	105	103	102	100	98	95	94	92	90	89	87	86	84	84
110°	117	116	117	117	117	115	114	113	112	111	108	107	105	103	101	99	97	96	95
120°	126	127	128	128	127	127	126	125	125	123	120	119	117	115	113	112	109	107	107
130°	135	136	137	138	138	138	138	137	136	133	133	131	130	128	126	124	121	120	118
140°	144	146	148	149	149	149	149	149	149	147	145	143	142	140	139	137	135	132	130
150°	153	155	157	158	158	159	160	160	160	159	157	156	155	153	151	149	146	145	143
160°	163	165	166	168	168	169	170	171	171	172	169	168	167	165	164	162	160	158	155
170°	171	173	175	177	178	180	181	182	182	182	181	180	179	178	177	175	172	170	169
180°	180	182	185	186	187	188	191	192	193	194	192	192	191	191	189	188	185	183	182
190°	189	191	193	196	197	199	200	202	203	204	203	203	204	202	202	200	199	197	194
200°	198	200	201	204	205	207	210	211	212	213	213	214	215	214	213	212	210	209	208
210°	206	209	211	214	215	216	219	221	222	224	224	225	225	226	225	225	222	222	220
220°	216	218	220	222	223	225	227	229	231	232	233	234	235	235	236	236	234	233	232
230°	225	226	228	230	231	234	236	237	240	242	242	245	245	247	247	247	246	245	243
240°	235	236	237	239	240	242	244	246	247	250	251	253	254	255	256	257	256	256	255
250°	244	245	246	248	248	250	252	254	256	258	260	261	263	264	265	266	266	266	267
260°	253	254	255	256	256	259	261	262	265	267	268	270	272	273	275	276	276	276	277
270°	263	264	264	265	266	267	269	270	273	275	275	277	279	281	283	284	284	285	286
280°	274	273	273	274	274	275	277	278	281	282	283	286	288	289	292	293	294	295	296
290°	284	284	283	282	283	284	286	287	289	290	291	293	295	297	299	301	302	303	304
300°	294	293	293	293	292	293	294	295	296	298	299	301	303	305	308	309	309	311	312
310°	305	304	304	303	302	301	302	303	304	305	307	309	310	313	315	317	318	320	321
320°	315	315	313	313	311	311	311	312	313	314	315	316	318	320	322	324	325	327	329
330°	327	325	324	322	321	320	320	321	321	322	322	324	325	327	329	331	332	335	337
340°	337	336	335	333	331	331	330	330	330	330	330	331	334	335	337	339	340	342	343
350°	349	347	345	343	341	340	340	339	339	339	339	340	341	343	344	346	347	349	351

Mean longitude

Actual geocentric place	190 dys. Degrees.	200 dys. Degrees.	210 dys Degrees.	220 dys Degrees.	230 dys. Degrees.	240 dys Degrees.	250 dys Degrees.	260 dys Degrees.	270 dys. Degrees.	280 dys. Degrees.	290 dys. Degrees.	300 dys Degrees.	310 dys. Degrees.	320 dys. Degrees.	330 dys Degrees.	340 dys. Degrees.	350 dys. Degrees.	360 dys. Degrees.
0°	0	3	5	5	6	7	10	10	10	10	10	9	9	7	6	4	2	1
10°	7	10	12	12	14	15	17	18	19	19	19	19	18	18	17	15	13	11
20°	15	17	19	20	21	23	26	27	28	28	29	28	28	28	27	25	24	23
30°	22	25	27	28	30	32	33	35	36	37	37	38	38	38	38	36	34	33
40°	30	32	34	35	37	39	41	42	44	44	46	46	47	47	47	45	45	45
50°	38	39	41	42	44	47	48	50	53	53	55	56	57	58	58	56	56	55
60°	46	48	49	51	52	54	56	58	60	61	63	65	66	66	67	66	66	66
70°	55	56	57	58	60	62	64	66	68	69	70	72	73	74	75	75	76	76
80°	63	64	65	67	68	71	72	74	76	77	79	81	83	84	86	86	86	86
90°	74	74	75	75	77	78	80	82	84	84	87	89	91	93	94	95	96	96
100°	83	83	83	84	85	87	88	90	93	93	95	98	100	101	104	104	105	106
110°	95	95	95	94	95	96	98	99	102	102	104	106	108	110	112	113	114	115
120°	105	105	104	104	104	105	106	107	109	110	112	114	116	119	120	121	124	125
130°	117	116	116	114	115	115	116	117	119	119	120	123	125	128	130	131	133	135
140°	128	128	127	125	125	125	126	127	128	128	130	132	134	136	138	139	141	144
150°	141	140	139	136	137	135	136	136	137	137	139	140	143	145	148	149	151	153
160°	153	152	151	149	148	147	147	147	148	148	149	150	152	154	156	157	159	161
170°	167	165	164	161	159	159	158	158	158	158	158	159	161	163	165	167	169	170
180°	180	178	176	173	172	171	170	170	169	169	169	170	171	173	174	175	177	179
190°	193	191	190	186	184	184	182	181	181	179	179	180	181	182	183	184	186	188
200°	206	204	202	199	198	196	194	193	191	191	191	190	191	192	193	193	196	197
210°	218	216	215	212	210	209	207	205	204	202	201	201	202	202	203	203	204	206
220°	231	229	227	224	222	221	219	218	217	214	214	212	213	213	212	212	213	216
230°	242	241	240	237	235	234	232	230	228	226	225	224	223	223	223	223	223	224
240°	254	254	252	249	247	246	244	242	241	238	237	236	235	233	233	233	234	235
250°	265	265	263	261	260	258	257	255	253	250	248	247	246	245	244	243	243	244
260°	276	276	274	273	271	270	269	266	265	262	261	259	257	255	255	253	253	253
270°	286	286	285	284	283	281	280	278	276	273	272	270	269	267	266	265	264	264
280°	296	297	296	295	293	292	291	290	288	286	284	283	281	279	277	275	274	274
290°	305	306	306	305	304	301	303	302	300	297	295	294	292	290	289	287	285	285
300°	313	314	314	314	315	314	313	311	311	308	307	305	304	301	300	297	296	295
310°	322	324	324	324	324	324	324	322	322	319	318	316	315	313	312	309	307	305
320°	330	331	333	333	333	334	333	333	332	330	329	328	326	324	322	319	318	317
330°	337	339	340	342	343	343	343	343	342	341	339	338	337	336	334	331	329	327
340°	346	347	349	349	351	352	352	352	352	351	350	349	348	346	345	342	340	339
350°	353	355	356	357	358	0	1	1	1	0	0	0	358	357	356	353	351	348

TABLE IV.—Venus Eye-Table.

Showing actual longitude (in ordinary type) corresponding to mean longitude (in heavy type) for every ten complete days of the Indian Solar year. (Text page 132)

Mean longitude Degrees.	0 dy. Degrees.	10 dys. Degrees	20 dys. Degrees.	30 dys. Degrees.	40 dys. Degrees	50 dys. Degrees.	60 dys. Degrees	70 dys. Degrees	80 dys. Degrees.	90 dys. Degrees	100 dys. Degrees.	110 dys. Degrees	120 dys. Degrees	130 dys. Degrees	140 dys. Degrees	150 dys. Degrees	160 dys. Degrees	170 dys. Degrees.	180 dys. Degrees
0	0	5	11	17	22	28	34	40	46	52	58	65	72	80	88	99	112	131	156
10	3	10	15	20	26	32	38	44	50	55	62	68	75	82	89	98	108	121	140
20	8	14	19	25	31	36	42	48	53	59	66	71	77	84	92	99	107	118	131
30	12	20	24	29	35	40	46	51	58	63	69	75	81	88	94	101	109	118	128
40	16	22	27	33	39	45	50	56	62	67	73	79	85	91	97	104	111	118	127
	0	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**	**130**	**140**	**150**	**160**	**170**	**180**
50	20	26	32	37	43	49	54	60	66	71	77	83	89	95	100	107	113	121	128
60	24	30	36	42	47	53	58	64	69	75	81	87	93	98	104	110	117	123	130
70	28	35	40	46	51	57	63	68	74	79	85	91	96	102	108	114	120	127	133
80	32	38	44	50	55	61	66	72	78	83	89	95	100	106	112	118	124	130	137
90	38	42	48	54	60	65	71	77	82	88	93	99	105	110	116	122	128	134	140
	0	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**	**130**	**140**	**150**	**160**	**170**	**180**
100	38	45	51	57	63	69	75	81	87	92	98	103	109	114	120	126	132	137	144
110	42	48	55	61	67	73	79	85	90	96	102	107	112	119	124	130	136	142	148
120	44	51	58	65	71	77	83	88	94	100	106	111	117	123	128	134	140	146	151
130	45	53	61	68	75	81	87	93	98	104	110	116	121	127	133	138	144	150	156
140	45	55	63	71	77	84	91	96	103	108	114	119	125	131	136	142	148	154	159
	0	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**	**130**	**140**	**150**	**160**	**170**	**180**
150	43	45	65	73	80	88	94	100	106	112	118	124	130	135	141	148	152	158	164
160	37	53	65	74	83	90	97	104	110	116	122	128	133	140	145	151	156	162	168
170	23	46	62	74	84	92	100	107	113	120	125	132	137	143	149	155	161	166	172
180	1	32	56	72	84	93	102	110	117	123	129	136	142	148	153	159	165	170	176
190	336	7	41	65	81	93	103	112	119	126	133	139	145	151	156	163	157	174	180
	0	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**	**130**	**140**	**150**	**160**	**170**	**180**
200	322	345	15	50	74	91	94	113	121	129	136	143	149	155	161	167	173	179	185
210	315	338	355	22	59	83	100	112	123	131	139	146	153	158	165	171	177	183	189
220	313	325	342	4	34	68	92	109	122	132	141	148	155	162	168	175	181	187	193
230	314	323	335	350	14	43	77	101	119	132	143	150	158	165	172	178	185	191	197
240	315	323	333	345	0	23	53	87	110	128	141	151	160	168	175	182	188	195	201
	0	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**	**130**	**140**	**150**	**160**	**170**	**180**
250	317	325	333	343	354	9	30	61	92	119	138	151	160	170	178	185	192	198	204
260	321	327	335	348	353	4	19	42	70	101	128	147	160	171	180	188	195	202	209
270	324	330	337	345	352	3	13	25	48	79	109	138	156	170	181	190	197	205	212
280	327	334	340	347	354	3	12	23	38	57	87	117	147	165	179	190	200	207	215
290	331	337	344	350	357	4	12	22	32	47	76	95	127	157	175	189	200	209	217
	0	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**	**130**	**140**	**150**	**160**	**170**	**180**
300	335	341	347	353	0	7	14	22	31	42	56	75	104	138	166	185	199	210	222
310	339	345	350	357	8	10	16	24	32	41	51	65	84	114	146	174	194	209	220
320	343	349	355	1	7	13	19	26	33	41	50	61	74	94	119	156	183	205	219
330	346	353	359	5	11	17	23	29	36	43	51	60	79	93	102	180	164	192	215
340	351	356	3	8	14	21	26	33	39	46	53	60	70	80	92	112	139	174	203
350	355	1	7	13	18	24	30	36	42	48	55	62	70	79	89	102	121	147	184

Mean longitude Degrees	190 dys. Degrees	200 dys. Degrees.	210 dys. Degrees	220 dys. Degrees.	230 dys. Degrees.	240 dys. Degrees.	250 dys. Degrees	260 dys. Degrees.	270 dys. Degrees	280 dys. Degrees.	290 dys. Degrees.	300 dys. Degrees.	310 dys. Degrees.	320 dys. Degrees.	330 dys. Degrees.	340 dys. Degrees.	350 dys. Degrees.	360 dys. Degrees.
0	191	223	244	259	270	280	288	296	302	309	315	321	328	334	329	345	351	357
10	167	201	234	254	270	281	290	298	305	312	319	325	332	338	344	349	355	1
20	150	177	211	244	264	280	291	300	308	315	322	329	335	342	348	351	359	5
30	141	158	185	221	254	275	290	301	310	318	326	333	340	345	352	357	4	10
40	137	151	168	197	231	265	286	300	311	320	328	336	342	350	355	2	7	13
	190	**200**	**210**	**220**	**230**	**240**	**250**	**260**	**270**	**280**	**290**	**300**	**310**	**320**	**330**	**340**	**350**	**360**
50	137	147	160	179	207	242	275	296	311	321	330	338	346	353	359	5	11	17
60	138	147	157	170	188	217	252	284	306	320	331	340	348	356	2	6	16	21
70	148	149	157	167	180	199	228	263	295	316	330	341	350	358	6	12	19	25
80	143	150	158	167	177	191	208	235	275	305	326	341	351	0	9	16	22	29
90	146	153	160	168	177	187	200	219	247	288	316	336	351	1	10	18	25	32
	190	**200**	**210**	**220**	**230**	**240**	**250**	**260**	**270**	**280**	**290**	**300**	**310**	**320**	**330**	**340**	**350**	**360**
100	150	156	163	171	178	186	198	210	229	258	297	326	346	0	11	20	28	35
110	154	160	166	173	180	188	197	207	220	240	268	307	334	356	10	21	30	38
120	157	163	170	176	183	190	198	207	217	230	250	279	321	344	6	20	31	40
130	161	167	173	180	187	193	200	208	217	228	241	262	289	327	356	16	30	41
140	166	171	177	183	190	196	203	210	218	227	228	252	270	310	332	6	25	39
	190	**200**	**210**	**220**	**230**	**240**	**250**	**260**	**270**	**280**	**290**	**300**	**310**	**320**	**330**	**340**	**350**	**360**
150	169	175	182	187	194	200	206	213	220	228	237	248	262	280	310	342	16	35
160	174	180	185	192	197	204	209	218	223	231	238	248	257	272	290	320	355	26
170	177	188	189	195	202	207	213	220	226	234	241	249	258	268	282	300	329	4
180	182	188	193	199	205	211	217	224	230	236	243	251	259	268	278	292	311	341
190	186	192	198	201	209	215	222	227	234	240	247	254	261	269	278	288	301	319
	190	**200**	**210**	**220**	**230**	**240**	**250**	**260**	**270**	**280**	**290**	**300**	**310**	**320**	**330**	**340**	**350**	**360**
200	190	196	202	208	213	221	225	232	237	244	250	257	264	271	279	288	298	312
210	195	200	206	212	218	223	231	236	242	248	254	261	267	274	281	289	298	308
220	199	208	210	216	222	228	233	239	245	252	253	264	271	277	284	391	299	308
230	202	209	215	220	226	232	238	244	250	256	262	268	274	281	287	294	301	309
240	207	213	219	225	230	236	242	248	254	260	266	272	278	284	291	297	304	311
	190	**200**	**210**	**220**	**230**	**240**	**250**	**260**	**270**	**280**	**290**	**300**	**310**	**320**	**330**	**340**	**350**	**360**
250	211	217	223	229	235	240	246	252	258	264	270	276	282	288	294	301	307	314
260	214	221	227	233	239	245	251	257	262	268	275	280	286	292	298	304	311	317
270	218	224	231	236	243	249	255	261	267	273	278	284	290	296	302	308	315	321
280	222	228	234	241	247	253	259	265	271	277	283	288	294	300	306	312	318	325
290	225	232	233	244	251	257	263	269	275	281	286	293	298	304	310	316	322	328
	190	**200**	**210**	**220**	**230**	**240**	**250**	**260**	**270**	**280**	**290**	**300**	**310**	**320**	**330**	**340**	**350**	**360**
300	227	235	241	248	254	261	267	273	279	285	291	297	303	308	314	320	326	332
310	229	237	245	252	258	265	271	278	283	289	295	301	307	313	319	324	330	336
320	231	239	248	255	262	269	275	281	288	293	299	305	311	317	323	329	334	340
330	230	240	249	258	265	272	279	285	291	298	303	310	315	321	327	333	339	314
340	225	239	250	260	268	275	282	289	295	301	308	314	319	325	331	337	343	349
350	213	235	249	260	270	278	285	292	298	305	311	318	324	330	336	341	347	352

TABLE IV.—Saturn Eye-Table.

Showing, for every tenth-day in the Indian Solar year, the mean longitude of Saturn corresponding to his actual geocentric place, entered in heavy type in column 1. (Text, page 132)

Mean longitude (Degrees).

Actual geocentric place.	0 dy	10 dys.	20 dys.	30 dys.	40 dys.	50 dys.	60 dys.	70 dys.	80 dys	90 dys.	100 dys	110 dys.	120 dys.	130 dys.	140 dys	150 dys.	160 dys.	170 dys.
0°	7	6	5	3	3	2	1	1	0	359	0	0	0	1	2	2	4	4
10°	16	16	14	13	13	11	10	10	10	10	10	10	9	11	11	11	13	13
20°	26	25	24	24	24	22	21	21	20	19	19	18	18	19	19	19	20	21
30°	36	36	35	33	32	32	30	30	28	28	28	27	27	28	28	28	29	29
40°	46	45	44	43	42	41	40	40	39	38	38	37	36	36	36	36	37	37
50°	55	55	54	53	53	51	50	50	48	47	47	46	45	45	44	44	45	45
60°	65	64	63	62	62	61	59	59	57	57	57	56	55	55	54	53	54	54
70°	73	73	73	71	71	71	70	69	68	68	66	65	64	64	63	62	62	62
80°	83	83	82	82	81	80	79	79	77	76	76	74	73	73	73	72	72	71
90°	91	92	91	91	91	90	88	88	88	86	86	84	83	83	82	81	81	80
100°	100	101	101	101	101	100	99	99	97	96	93	94	93	92	91	90	90	90
110°	109	110	110	110	110	109	108	108	107	106	106	104	103	103	102	100	100	99
120°	118	119	119	119	119	119	119	119	118	117	116	115	113	113	112	110	110	109
130°	127	128	128	129	129	[illegible]	128	128	128	127	126	125	124	123	122	121	121	121
140°	136	137	137	138	138	138	138	138	137	137	137	135	135	134	133	132	131	130
150°	145	146	147	148	149	149	149	149	148	148	148	147	145	145	144	142	142	140
160°	154	155	156	157	158	158	158	159	159	158	158	157	156	156	155	154	154	152
170°	164	165	165	166	167	167	168	169	169	169	169	168	168	168	167	165	164	163
180°	173	175	175	176	178	178	179	179	179	179	180	180	179	179	178	177	176	175
190°	182	184	185	185	186	187	187	188	190	190	191	189	189	189	187	188	188	186
200°	193	194	195	196	197	197	198	200	200	201	201	201	201	201	200	200	200	199
210°	202	204	205	206	206	208	209	211	211	212	213	213	213	214	213	212	212	211
220°	212	214	215	215	217	218	219	220	221	222	223	224	224	225	224	224	224	223
230°	224	225	226	227	228	228	229	231	232	232	234	234	235	235	235	235	235	236
240°	234	235	236	236	238	239	240	241	243	243	245	245	245	246	246	246	247	247
250°	245	246	246	247	248	249	251	252	253	253	255	256	256	258	258	258	259	259
260°	257	258	258	258	259	259	260	262	262	263	265	266	267	268	268	269	270	269
270°	267	263	268	268	270	270	270	272	273	274	276	276	277	278	279	279	280	280
280°	278	279	279	279	280	280	280	282	283	284	285	286	287	289	289	290	291	291
290°	289	290	289	289	290	290	291	292	292	293	295	295	296	298	299	299	301	301
300°	301	302	301	300	301	301	301	302	302	303	305	306	306	308	309	310	311	311
310°	312	312	311	311	311	311	311	312	312	312	314	315	315	316	318	319	320	321
320°	323	323	322	321	321	321	321	322	322	322	323	323	324	326	327	327	329	330
330°	333	334	333	332	332	332	331	332	332	331	333	333	334	335	335	337	339	339
340°	345	345	344	342	342	341	340	341	341	340	341	342	342	344	344	345	347	347
350°	355	355	355	354	352	352	351	351	351	350	351	351	352	353	354	354	356	356

Actual geocentric place.	180 dys.	190 dys	200 dys.	210 dys.	220 dys	230 dys.	240 dys.	250 dys.	260 dys.	270 dys	280 dys.	290 dys	300 dys	310 dys.	320 dys.	330 dys.	340 dys	350 dys.	360 dys.
0°	5	7	7	8	10	10	11	12	12	12	11	12	11	10	10	9	8	8	6
10°	13	14	15	16	17	18	19	20	20	20	20	21	20	20	20	19	18	18	17
20°	21	23	23	24	26	27	27	29	29	30	29	30	30	30	30	29	28	28	27
30°	29	31	31	32	33	34	35	36	37	37	37	39	39	38	39	38	37	37	36
40°	37	39	39	40	42	42	43	45	45	45	46	47	48	47	48	48	47	47	46
50°	45	47	47	48	49	50	51	52	53	54	54	55	56	56	56	56	56	56	55
60°	54	55	55	56	57	58	59	60	61	62	62	64	64	64	65	65	65	66	65
70°	62	63	63	63	65	65	66	68	68	69	70	71	72	72	73	74	73	74	74
80°	71	72	72	72	73	74	74	76	77	77	78	79	79	80	81	82	81	82	82
90°	79	80	80	80	81	81	82	83	84	85	85	87	88	88	90	90	90	92	92
100°	89	89	89	89	90	90	90	92	93	93	94	95	95	96	98	98	98	100	100
110°	99	99	98	97	98	98	98	100	100	101	102	103	104	105	106	107	107	109	109
120°	109	109	107	107	108	108	108	109	109	109	109	112	112	112	114	115	115	117	117
130°	118	118	116	116	117	117	116	117	118	118	118	119	121	121	123	124	124	126	127
140°	128	128	127	126	126	126	125	126	126	126	127	128	129	129	131	132	133	134	135
150°	139	138	138	137	137	136	136	137	136	135	136	137	137	138	140	140	141	143	143
160°	151	150	148	148	148	147	146	146	146	146	146	147	147	148	149	150	151	153	153
170°	162	161	160	159	158	157	156	156	156	156	156	157	157	158	159	159	160	161	162
180°	174	173	171	171	170	169	168	168	167	166	166	167	167	167	169	169	170	172	172
190°	185	185	184	182	182	181	179	179	178	177	177	178	177	177	179	179	179	181	181
200°	198	197	196	194	193	192	191	191	190	189	188	189	188	188	189	189	190	191	191
210°	210	209	208	206	206	204	203	203	202	201	200	200	199	199	200	200	200	201	202
220°	222	222	220	219	218	218	216	215	214	213	212	212	211	211	211	211	210	212	212
230°	234	234	233	232	232	230	228	228	226	225	224	223	222	221	222	221	221	223	223
240°	247	247	245	244	244	243	240	240	239	237	236	236	235	234	235	234	233	234	234
250°	259	258	257	257	256	255	254	252	251	250	250	248	247	247	246	245	244	245	245
260°	269	269	269	268	268	267	265	266	264	263	261	261	259	258	258	257	256	256	256
270°	280	281	280	280	280	280	278	278	276	275	273	273	271	270	270	268	268	268	268
280°	292	293	292	292	292	291	290	290	288	287	288	286	284	283	282	281	280	280	279
290°	302	303	303	303	303	302	301	301	300	299	297	297	296	294	293	292	291	291	290
300°	311	312	313	313	313	313	313	313	312	311	309	309	308	306	306	304	302	302	301
310°	322	323	323	323	324	324	324	324	323	322	320	320	319	317	317	316	315	315	313
320°	332	333	333	333	334	334	334	334	333	332	331	331	330	329	329	327	326	325	324
330°	340	342	342	343	344	344	344	344	344	343	342	342	341	340	339	338	336	336	334
340°	348	350	351	351	352	353	353	354	353	353	352	352	351	350	350	348	347	347	346
350°	356	358	359	359	1	1	1	2	2	2	2	3	1	0	0	359	358	358	356

TABLE IV-A.

Mean Places of Planets according to Indian Ephemeris at Commencement of each Century from 3102 B.C. to 1 B.C. (K.Y. 0 to K.Y. 3101.)

		Mars. Degrees	Mercury. Degrees	Jupiter. Degrees.	Venus. Degrees	Saturn. Degrees
B.C. 3102	K.Y. 0	347·00	318·06	15·73	29·55	339·20
3101	1	178·4072	12·8263	46·0829	254·7391	851·4239
3001	101	238·9342	88·8463	200·8275	93·7242	133·3308
2901	201	299·4612	164·8623	355·5721	292·7093	275·2377
2801	301	359·9882	240·8803	150·3167	131·6944	57·1446
2701	401	60·5152	316·8983	305·0613	330·6795	199·0515
2601	501	121·0422	32·9163	99·8059	169·6646	340·9584
2501	601	181·5692	108·9343	254·5505	8·6497	122·8653
2401	701	242·0962	184·9523	49·2951	207·6348	264·7722
2301	801	302·6232	260·9703	204·0397	46·6199	46·6791
2201	901	3·1502	336·9883	358·7843	245·6050	188·5860
2101	1001	63·6772	53·0063	153·5289	84·5901	330·4929
2001	1101	124·2042	129·0243	308·2735	283·5752	112·3998
1901	1201	184·7312	205·0428	103·0181	122·5608	254·3067
1801	1301	245·2582	281·0603	257·7627	321·5454	36·2136
1701	1401	305·7852	357·0783	52·5073	160·5305	178·1205
1601	1501	6·3122	73·0963	207·2519	359·5156	320·0274
1501	1601	66·8392	149·1143	1·9965	198·5007	101·9343
1401	1701	127·3662	225·1323	156·7411	37·4858	243·8412
1301	1801	187·8932	301·1503	311·4857	236·4709	25·7481
1201	1901	248·4202	17·1683	106·2303	75·4560	167·6550
1101	2001	308·9472	93·1863	260·9749	274·4411	309·5619
1001	2101	9·4742	169·2043	55·7195	113·4262	91·4688
901	2201	70·0012	245·2223	210·4641	312·4113	233·3757
801	2301	130·5282	321·2403	5·2087	151·3964	15·2826
701	2401	191·0552	37·2583	159·9533	350·3815	157·1895
601	2501	251·5822	113·2763	314·6979	189·3666	299·0964
501	2601	312·1092	189·2943	109·4425	28·3517	81·0033
401	2701	12·6362	265·3123	264·1871	227·3368	222·9102
301	2801	73·1632	341·3303	58·9317	66·3219	4·8171
201	2901	133·6902	57·3483	213·6763	265·3070	146·7240
101	3001	194·2172	133·3663	8·4209	104·2921	288·6309
1	3101	254·7442	209·3843	163·1655	303·2772	70·5378

TABLE IV-B.

Planets.—Revolutions and Increases of Longitude for different periods according to Sūrya Siddhānta and Indian Ephemeris. (See page 121, paragraph 297 of Text.)

	1,000 Years			100 Years			10 Years			1 Year		
	Revolutions and Fraction of Revolution.	Increase of Longitude. Degrees.	Increase of Longitude. Ephemeris Degrees.	Revolutions and Fraction of Revolution.	Increase of Longitude. Degrees.	Increase of Longitude. Ephemeris Degrees.	Revolutions and Fraction of Revolution.	Increase of Longitude. Degrees.	Increase of Longitude. Ephemeris Degrees.	Revolutions and Fraction of Revolution.	Increase of Longitude. Degrees.	Increase of Longitude. Ephemeris Degrees.
		Sūrya siddhānta.			Sūrya siddhānta			Sūrya siddhānta.			Sūrya siddhānta.	
Mars	531·674	242·64	245·27	53·1674	60·264	60·53	5·31674	114·0264	115·05	·531674	191·40264	191·40
Jupiter.	84·3102	111·672	107·447	8·43102	155·1672	154·74	·843102	303·51672	303·47	·0843102	30·351672	30·35
Saturn.	33·928	334·08	339·069	3·3928	141·408	141·91	·33928	122·1408	122·19	·033928	12·21408	12·22
Venus.	1625·55	198·00	189·852	162·555	199·8	198·98	16·2555	91·98	91·90	1·62555	225·198	225·19
Mercury	4152·10	36·00	40·18	415·210	75·6	76·018	41·521	187·56	187·6	4·1521	54·75	54·76

Mean longitude of planets at commencement of every millennium.		Mars. Sūrya siddhānta Degrees.	Mars. Indian Ephemeris Degrees.	Jupiter. Sūrya siddhānta Degrees	Jupiter. Indian Ephemeris Degrees	Saturn. Sūrya siddhānta Degrees.	Saturn. Indian Ephemeris Degrees.	Venus. Sūrya siddhānta Degrees.	Venus. Indian Ephemeris Degrees.	Mercury. Sūrya siddhānta Degrees.	Mercury. Indian Ephemeris Degrees
B.C. 3102	K.Y. 0	358·86	347·00	359·82	15·73	359·93	339·20	356·52	29·55	351·12	318·06
3101	1	190·26	178·41	30·17	46·08	12·14	351·42	221·72	254·74	45·87	12·83
2101	1001	72·90	63·68	141·84	153·53	346·22	330·49	59·72	84·59	81·87	53·01
1101	2001	315·54	308·95	253·51	260·97	320·80	309·56	257·72	274·44	117·87	93·19
101	3001	198·18	194·22	5·18	8·42	294·38	288·68	95·72	104·29	153·87	183·37
A.D. 900	4001	80·82	79·49	116·85	115·87	268·46	267·70	293·72	294·14	189·87	178·55
1900	5001	323·48	324·76	228·52	223·31	242·54	246·77	131·72	123·99	225·87	213·78

TABLE IV-C.

Sun's mean Longitude and Equation for every complete day of Indian Solar year.

Day	⊙'s mean longitude. Degrees.	Eqn.	Day	⊙'s mean longitude. Degrees.	Eqn.	Day	⊙'s mean longitude. Degrees.	Eqn.	Day	⊙'s mean longitude. Degrees.	Eqn.	Day	⊙'s mean longitude. Degrees.	Eqn.
0	357·8608	+2·1378	74	70·7952	+·2486	148	143·7298	−1·9980	222	216·6643	−1·4308	296	289·5989	+1·1814
1	358·8462	2·1333	75	71·7808	·2107	149	144·7154	2·0122	223	217·6499	1·4028	297	290·5845	1·2130
2	359·8318	2·1228	76	72·7664	·1717	150	145·7010	2·0253	224	218·6356	1·3733	298	291·5701	1·2439
3	0·8174	2·1133	77	73·7520	·1333	151	146·6866	2·0369	225	219·6212	1·3439	299	292·5558	1·2747
4	1·8030	2·1036	78	74·7376	·0975	152	147·6722	2·0492	226	220·6068	1·3144	300	293·5414	1·3036
5	2·7886	2·0967	79	75·7232	·0600	153	148·6578	2·0611	227	221·5924	1·2828	301	294·5270	1·3322
6	3·7742	2·0858	80	76·7088	·0203	154	149·6434	2·0739	228	222·5780	1·2533	302	295·5126	1·3622
7	4·7598	2·0767	81	77·6944	·0167	155	150·6290	2·0858	229	223·5636	1·2228	303	296·4982	1·3903
8	5·7454	2·0647	82	78·6800	·0550	156	151·6146	2·0955	230	224·5492	1·1905	304	297·4838	1·4197
9	6·7310	2·0514	83	79·6656	·0933	157	152·6002	2·1036	231	225·5348	1·1589	305	298·4694	+1·4482
10	7·7166	2·0394	84	80·6512	·1314	158	153·5858	2·1136	232	226·5204	1·1283	306	299·4550	1·4747
11	8·7022	2·0267	85	81·6368	·1692	159	154·5714	2·1228	233	227·5060	1·0967	307	300·4406	1·5042
12	9·6878	2·0122	86	82·6224	·2073	160	155·5570	2·1314	234	228·4916	1·0614	308	301·4262	1·5297
13	10·6734	1·9986	87	83·6080	·2444	161	156·5426	2·1383	235	229·4772	1·0283	309	302·4118	1·5567
14	11·6590	1·9833	88	84·5936	·2833	162	157·5282	2·1433	236	230·4628	·9953	310	303·3974	1·5833
15	12·6446	1·9667	89	85·5792	·3203	163	158·5138	2·1494	237	231·4484	·9622	311	304·3830	1·6089
16	13·6302	1·9500	90	86·5648	·3572	164	159·4994	2·1567	238	232·4340	·9280	312	305·3686	1·6344
17	14·6158	1·9333	91	87·5504	·3955	165	160·4850	2·1603	239	233·4196	·8928	313	306·3542	1·6589
18	15·6014	1·9167	92	88·5360	·4333	166	161·4706	2·1617	240	234·4052	·8597	314	307·3398	1·6819
19	16·5870	1·9000	93	89·5216	·4692	167	162·4562	2·1667	241	235·3908	·8228	315	308·3254	1·7050
20	17·5726	1·8833	94	90·5072	·5061	168	163·4418	2·1692	242	236·3764	·7894	316	309·3110	1·7280
21	18·5582	1·8622	95	91·4928	·5433	169	164·4274	2·1728	243	237·3620	·7536	317	310·2966	1·7497
22	19·5438	1·8419	96	92·4784	·5789	170	165·4130	2·1742	244	238·3476	·7203	318	311·2822	1·7728
23	20·5294	1·8217	97	93·4640	·6167	171	166·3986	2·1755	245	239·3332	·6833	319	312·2678	1·7922
24	21·5150	1·8025	98	94·4496	·6525	172	167·3842	2·1769	246	240·3188	·6469	320	313·2534	1·8153
25	22·5006	1·7814	99	95·4352	·6891	173	168·3698	2·1755	247	241·3044	·6097	321	314·2390	1·8347
26	23·4862	1·7600	100	96·4208	·7228	174	169·3554	2·1742	248	242·2900	·5739	322	315·2246	1·8530
27	24·4718	1·7383	101	97·4064	·7586	175	170·3410	2·1728	249	243·2756	·5369	323	316·2102	1·8725
28	25·4574	1·7167	102	98·3920	·7944	176	171·3266	2·1714	250	244·2612	·5000	324	317·1958	1·8917
29	26·4430	1·6933	103	99·3776	·8289	177	172·3122	2·1678	251	245·2468	·4636	325	318·1814	1·9111
30	27·4286	1·6680	104	100·3632	·8633	178	173·2978	2·1642	252	246·2324	·4253	326	319·1670	1·9269
31	28·4142	1·6455	105	101·3488	·8986	179	174·2834	2·1597	253	247·2180	·3883	327	320·1526	1·9453
32	29·3998	1·6192	106	102·3344	·9333	180	175·2690	2·1561	254	248·2036	·3500	328	321·1382	1·9611
33	30·3854	1·5955	107	103·3200	·9667	181	176·2546	2·1489	255	249·1892	·3122	329	322·1238	1·9758
34	31·3710	1·5692	108	104·3056	1·0009	182	177·2402	2·1439	256	250·1748	·2753	330	323·1094	1·9917
35	32·3567	1·5455	109	105·2912	1·0333	183	178·2258	2·1367	257	251·1604	·2369	331	324·0950	2·0064
36	33·3423	1·5167	110	106·2768	1·0667	184	179·2114	2·1305	258	252·1460	·1992	332	325·0806	2·0211
37	34·3279	1·4914	111	107·2625	1·1000	185	180·1970	2·1219	259	253·1316	·1597	333	326·0662	2·0347
38	35·3135	1·4633	112	108·2481	1·1308	186	181·1827	2·1133	260	254·1172	·1228	334	327·0518	2·0483
39	36·2991	1·4358	113	109·2337	1·1622	187	182·1683	2·1061	261	255·1029	·0817	335	328·0374	2·0597
40	37·2847	1·4061	114	110·2193	1·1955	188	183·1539	2·0964	262	256·0885	·0469	336	329·0231	2·0708
41	38·2703	1·3778	115	111·2049	1·2253	189	184·1395	2·0853	263	257·0741	·0086	337	330·0087	2·0819
42	39·2559	1·3480	116	112·1905	1·2561	190	185·1251	2·0753	264	258·0597	+·0394	338	330·9943	2·0930
43	40·2415	1·3180	117	113·1761	1·2858	191	186·1107	2·0642	265	259·0453	·0764	339	331·9799	2·1017
44	41·2271	1·2894	118	114·1617	1·3167	192	187·0963	2·0519	266	260·0309	·1111	340	332·9655	2·1114
45	42·2127	1·2586	119	115·1473	1·3455	193	188·0819	2·0383	267	261·0165	·1469	341	333·9511	2·1211
46	43·1983	1·2197	120	116·1329	1·3739	194	189·0675	2·0261	268	262·0021	·1847	342	334·9367	2·1283
47	44·1839	1·1967	121	117·1185	1·4025	195	190·0531	2·0125	269	262·9877	·2239	343	335·9223	2·1369
48	45·1695	1·1647	122	118·1041	1·4333	196	191·0387	1·9978	270	263·9733	·2586	344	336·9079	2·1430
49	46·1551	1·1347	123	119·0897	1·4586	197	192·0243	1·9819	271	264·9589	·2992	345	337·8935	2·1480
50	47·1407	1·1014	124	120·0753	1·4883	198	193·0099	1·9661	272	265·9445	·3369	346	338·8791	2·1542
51	48·1263	1·0703	125	121·0609	1·5133	199	193·9955	1·9514	273	266·9301	·3739	347	339·8647	2·1592
52	49·1119	1·0369	126	122·0465	1·5405	200	194·9811	1·9333	274	267·9157	·4122	348	340·8503	2·1628
53	50·0975	1·0025	127	123·0321	1·5667	201	195·9667	1·9161	275	268·9013	·4500	349	341·8359	2·1653
54	51·0831	·9703	128	124·0177	1·5919	202	196·9523	1·9003	276	269·8869	·4869	350	342·8215	2·1689
55	52·0687	·9358	129	125·0033	1·6167	203	197·9379	1·8808	277	270·8725	·5253	351	343·8071	2·1703
56	53·0543	·9025	130	125·9889	1·6433	204	198·9235	1·8600	278	271·8581	·5611	352	344·7927	2·1717
57	54·0399	·8667	131	126·9745	1·6667	205	199·9091	1·8417	279	272·8437	·5980	353	345·7783	2·1730
58	55·0255	·8333	132	127·9601	1·6894	206	200·8947	1·8222	280	273·8293	·6347	354	346·7639	2·1755
59	56·0111	·7964	133	128·9457	1·7133	207	201·8803	1·8014	281	274·8149	·6692	355	347·7495	2·1764
60	56·9967	·7622	134	129·9313	1·7358	208	202·8659	1·7805	282	275·8005	·7061	356	348·7351	2·1739
61	57·9823	·7267	135	130·9169	1·7572	209	203·8515	1·7575	283	276·7861	·7419	357	349·7207	2·1714
62	58·9679	·6919	136	131·9025	1·7789	210	204·8371	1·7369	284	277·7717	·7764	358	350·7063	2·1700
63	59·9535	·6561	137	132·8881	1·8000	211	205·8227	1·7139	285	278·7573	·8122	359	351·6919	2·1686
64	60·9391	·6192	138	133·8737	1·8217	212	206·8083	1·6894	286	279·7429	·8469	360	352·6775	2·1650
65	61·9247	·5847	139	134·8593	1·8419	213	207·7939	1·6664	287	280·7285	·8803	361	353·6631	2·1625
66	62·9103	·5480	140	135·8449	1·8597	214	208·7795	1·6433	288	281·7141	·9147	362	354·6487	2·1589
67	63·8959	·5111	141	136·8305	1·8789	215	209·7651	1·6178	289	282·6997	·9500	363	355·6343	2·1528
68	64·8815	·4739	142	137·8161	1·8980	216	210·7507	1·5922	290	283·6853	·9833	364	356·6199	2·1467
69	65·8671	·4369	143	138·8017	1·9167	217	211·7363	1·5667	291	284·6709	1·0192	365	357·6055	2·1405
70	66·8527	·4000	144	139·7873	1·9333	218	212·7219	1·5411	292	285·6565	1·0508			
71	67·8383	·3622	145	140·7729	1·9500	219	213·7075	1·5130	293	286·6421	1·0850			
72	68·8239	·3192	146	141·7585	1·9667	220	214·6931	1·4869	294	287·6277	1·1167			
73	69·8096	·2869	147	142·7441	1·9825	221	215·6787	1·4589	295	288·6133	1·1483			

TABLE IV-D.

Decimal parts of ☉'s L. corresponding to decimal parts of a day.

Day.	Degree.	Day.	Degree.	Day.	Degree.	Day.	Degree.	Day.	Degree.	Day.	Degree.	Day.	Degree.	Day.	Degree.	Day.	Degree.
·01	·0039	·13	·1281	·24	·2365	·35	·3450	·46	·4534	·57	·5618	68	·6702	·79	·7786	·90	·8870
·02	·0197	·14	·1380	·25	·2464	·36	·3548	·47	·4632	·58	·5716	69	·6801	80	·7885	·91	·8969
·03	·0296	·15	·1478	·26	·2563	·37	·3647	·48	·4731	·59	5815	·70	·6899	81	·7983	·92	·9067
·04	·0394	·16	·1577	·27	·2661	·38	·3745	·49	·4829	·60	·5914	·71	·6998	·82	·8082	93	9166
·05	·0493	·17	·1675	·28	·2760	·39	·3844	·50	·4928	·61	·6012	·72	·7096	83	·8180	·94	·9265
·06	·0591	·18	·1774	·29	2858	·40	·3942	·51	·5027	·62	·6111	73	·7195	·84	·8279	·95	·9363
·07	·0690	·19	·1873	·30	2957	·41	·4041	·52	·5125	·63	·6209	·74	·7298	·85	·8378	·96	·9462
·08	·0788	·20	·1971	·31	·3055	·42	·4139	·53	·5224	·64	·6308	·75	·7392	·86	·8476	·97	·9560
·09	·0887	·21	·2070	·32	·3154	·43	4238	·54	·5322	·65	6406	·76	·7491	·87	8575	·98	9659
·10	·0986	·22	·2168	·33	3252	·44	·4337	·55	·5421	66	·6505	77	·7589	88	8673	·99	·9757
·11	·1084	·23	·2267	·34	·3351	·45	·4435	·56	·5519	67	·6603	·78	7688	·89	·8772	100	·9856
·12	·1183																

TABLE IV-E

Sun's Longitude in days (360 = 365·25875648 days).

Degrees.	Days	Degrees	Days	Minutes of degree	Fraction of day.	Minutes of degree	Fraction of day.	Minutes of degree	Fraction of day	Minutes of degree	Fraction of day	Minutes of degree	Fraction of day
1	1 0146076	40	40 5843064	1	·0169101	13	·2198316	25	4227532	37	·6256747	49	·8285962
2	2·0292153	50	50 7303830	2	·0338202	14	·2367418	26	·4396633	38	6425848	50	·8455063
3	3·0438230	60	60 8764596	3	·0507304	15	2536519	27	·4565734	39	·6594949	51	·8624165
4	4 0584306	70	71 0225362	4	0676405	16	·2705620	28	4734835	40	·6764051	52	8793266
5	5 0730383	80	81·1686128	5	0845506	17	2874722	29	4903937	41	·6933152	53	·8962367
6	6 0876460	90	91 3146894	6	·1014608	18	·3043823	30	5073038	42	·7102253	54	·9131468
7	7·1022536	100	101·4607660	7	·1183709	19	·3212924	31	·5242139	43	7271355	55	·9300570
8	8·1168613	200	202·9215320	8	·1352810	20	3382025	32	·5411241	44	7440456	56	·9469671
9	9·1314689	300	304·3822980	9	1521911	21	·3551127	33	5580342	45	·7609557	57	·9638772
10	10 1460766	360	365 2587565	10	·1691013	22	3720228	34	5749443	46	7778658	58	9807874
20	20 2921532			11	1860114	23	3889329	35	·5918544	47	·7947760	59	·9976975
30	30 4382298			12	·2029215	24	4058430	36	6087646	48	·8116861	60	1 0146076

TABLE IV-F

Decimal parts of increase of ☾'s L. corresponding to decimal parts of a nakshatra.

	Degrees.		Degrees.		Degrees.		Degrees.		Degrees.		Degrees.		Degrees		Degrees.		Degrees
·01	·1333	13	1·7333	·24	3 2000	35	4 6666	·46	6 1333	·57	7 6000	68	9 0666	79	10 5333	·90	12 0000
·02	·2666	·14	1 8666	25	3 3333	·36	4 8000	47	6 2666	·58	7 7333	·69	9 2000	80	10 6666	·91	12 1333
·03	4000	·15	2·0000	·26	3 4666	·37	4 9333	·48	6 4000	·59	6 8666	·70	9·3333	·81	10 8000	·92	12 2666
·04	·5333	·16	2·1333	·27	3 6000	38	5·0666	·49	6 5333	·60	8·0000	71	9·4666	·82	10·9333	·93	12·4000
·05	·6666	·17	2 2666	28	3 7333	·39	5 2000	·50	6 6666	61	8 1333	·72	9·6000	83	11 0666	·94	12·5333
·06	·8000	·18	2·4000	·29	3 8666	·40	5 3333	·51	6·8000	·63	8·2666	73	9 7333	·84	11·2000	·95	12 6666
·07	·9333	·19	2 5333	·30	4 0000	·41	5·4666	52	6·9333	·63	8 4000	·74	9 8666	·85	11 3333	96	12 8000
·08	1 0666	·20	2·6666	31	4 1333	·42	5 6000	·53	7·0666	·64	8·5333	·75	10 0000	·86	11·4666	·97	12·9333
·09	1 2000	·21	2 8000	·32	4·2666	·43	5·7333	·54	7·2000	·65	8 6666	76	10·1333	87	11·6000	·98	13·0666
10	1·3333	·22	2·9333	·33	4·4000	·44	5·8666	·55	7·3333	·66	8 8000	77	10 2666	·88	11 7333	·99	13·2000
·11	1 4666	·23	3 0666	·34	4·5333	·45	6 0000	·56	7·4666	·67	8 9333	·78	10 4000	89	11·8666	1·00	13·3333
·12	1·6000																

TABLE IV-G.

Eqn. in minutes of a degree for ascertaining the latitude of a planet. (Paragraphs 238, 240 of Text.)

Degree.	Mar	Mer.	Jup	Ven	Sat	Degree.	Degree.	Mar	Mer.	Jup.	Ven.	Sat.	Degree	Degree.	Mar.	Mer	Jup	Ven	Sat.	Degree.
0·00	5682	4708	4107	5940	3811	**360 00**	**75·00**	4547	3957	3676	4734	3556	**285·00**	**150·00**	1874	2426	2871	1786	3117	**210 00**
3 75	5678	4706	4107	5936	3810	**356 25**	**78 75**	4429	3886	3635	4617	3534	**281·25**	**153·75**	1743	2370	2847	1630	3104	**206·25**
7 50	5667	4699	4104	5925	3809	**352·50**	**82 50**	4327	3813	3593	4496	3509	**277·50**	**157·50**	1618	2319	2826	1481	3092	**202·50**
11·25	5651	4688	4099	5909	3806	**348·75**	**86 25**	4210	3738	3550	4371	3484	**273·75**	**161·25**	1503	2275	2807	1341	3083	**198·75**
15 00	5629	4674	4092	5886	3801	**345·00**	**90 00**	4090	3662	3506	4241	3459	**270·00**	**165·00**	1402	2238	2793	1213	3077	**195 00**
18·75	5601	4656	4083	5857	3795	**341 25**	**93·75**	3966	3584	3461	4107	3434	**266·25**	**168·75**	1347	2208	2782	1101	3072	**191·25**
22 50	5567	4634	4071	5822	3788	**337·50**	**97·50**	3839	3504	3417	3970	3409	**262·50**	**172·50**	1251	2186	2774	1013	3068	**187·50**
26 25	5528	4608	4056	5781	3779	**333·75**	**101 25**	3708	3423	3372	3828	3384	**258·75**	**176·25**	1209	2173	2770	956	3066	**183·75**
30·00	5484	4578	4040	5734	3769	**330 00**	**105·00**	3575	3341	3326	3684	3359	**255·00**	**180·00**	1194	2168	2769	936	3065	**180·00**
33 75	5431	4545	4021	5681	3758	**326 25**	**108 75**	3410	3259	3282	3536	3335	**251·25**							
37 50	5379	4507	3999	5622	3745	**322 50**	**112·50**	3303	3177	3238	3385	3313	**247·50**							
41·25	5318	4467	3976	5558	3731	**318 75**	**116 25**	3162	3095	3195	3231	3289	**243·75**							
45·00	5252	4423	3951	5487	3716	**315·00**	**120 00**	3019	3012	3152	3075	3265	**240·00**							
48·75	5181	4373	3922	5412	3699	**311 25**	**123 75**	2875	2930	3110	2916	3242	**236 25**							
52·50	5104	4324	3892	5331	3682	**307·50**	**127·50**	2730	2851	3070	2756	3221	**232·50**							
56·25	5023	4270	3860	5244	3663	**303·75**	**131·25**	2585	2773	3032	2594	3200	**228 75**							
60 00	4937	4213	3827	5152	3643	**300 00**	**135·00**	2440	2697	2995	2432	3181	**225·00**							
63·75	4846	4153	3791	5055	3623	**296·25**	**138·75**	2295	2624	2961	2269	3162	**221·25**							
67·50	4751	4090	3754	4953	3601	**292·50**	**142·50**	2152	2554	2928	2106	3146	**217·50**							
71·25	4651	4025	3716	4846	3579	**288·75**	**146·25**	2011	2487	2898	1945	3131	**213·75**							

In applying the above equations the following data, giving the inclination of the moon's orbit to the ecliptic and the greatest apparent latitude of the other planets have to be remembered:-

Inclination of ☾'s orbit 4° 30′, Sine 270′
Greatest latitude Mars 1° 30′ „ 90′
„ „ Mercury 2° 0′ „ 120′
„ „ Jupiter 1° 16′ „ 78′
„ „ Venus 2° 16′ „ 138′
„ „ Saturn 2° 10′ „ 132′

TABLE IV-H.

Table of Hindu Sines. (Paragraphs 238—240 of Text.)

Degree. +	Sine.	Degree. +	Sine	Degree +	Sine	Degree +	Sine.	Degree −	Diff. +	Degree. −	Diff +	Degree −	Diff −	Degree −	Diff. −
0·00	000	**48·75**	2585	**93·75**	3431	**138·75**	2267	**180 00**	...	**228·75**	154	**273 75**	7	**318·75**	164
3·75	225	**52 50**	2728	**97·50**	3409	**142·50**	2093	**183·75**	225	**232·50**	143	**277 50**	22	**322·50**	174
7·50	449	**56·25**	2859	**101·25**	3372	**146·25**	1910	**187 50**	224	**236·25**	131	**281·25**	37	**326·25**	183
11·25	671	**60·00**	2978	**105·00**	3321	**150·00**	1719	**191 25**	222	**240 00**	119	**285·00**	51	**330·00**	191
15·00	890	**63·75**	3084	**108·75**	3256	**153·75**	1520	**195 00**	219	**243·75**	106	**288·75**	65	**333·75**	199
18·75	1105	**67·50**	3177	**112·50**	3177	**157·50**	1315	**198·75**	215	**247·50**	93	**292·50**	79	**337·50**	205
22·50	1315	**71·25**	3256	**116·25**	3084	**161·25**	1105	**202 50**	210	**251·25**	79	**296·25**	93	**341·25**	210
26 25	1520	**75·00**	3321	**120·00**	2978	**165·00**	890	**206·25**	205	**255 00**	65	**300·00**	106	**345·00**	215
30·00	1719	**78·75**	3372	**123·75**	2859	**168 75**	671	**210 00**	199	**258·75**	51	**303·75**	119	**348·75**	219
33 75	1910	**82·50**	3409	**127·50**	2728	**172·50**	449	**213·75**	191	**262·50**	37	**307·50**	131	**352·50**	222
37·50	2093	**86·25**	3431	**131·25**	2585	**176·25**	225	**217 50**	183	**266·25**	22	**311·25**	143	**356·25**	224
41·25	2267	**90·00**	3438	**135·00**	2431	**180·00**	000	**221·25**	174	**270·00**	7	**315·00**	154	**360·00**	225
45·00	2431							**225·00**	164						

TABLE IV-J.

Decimal parts of 3·75 degree; [Example 3·2° = 85·3 of 3·75°].

0·1	·026666	**0·6**	·160000	**1·1**	·293333	**1·6**	·426666	**2·1**	·560000	**2·6**	·693333	**3·1**	·826666	**3·6**	·960000
0·2	·053333	**0 7**	·186666	**1·2**	·320000	**1 7**	453333	**2·2**	·586666	**2·7**	·720000	**3·2**	·853333	**3·7**	·986666
0·3	·080000	**0·8**	·213333	**1·3**	·346666	**1·8**	480000	**2·3**	·613333	**2·8**	·746666	**3·3**	·880000		
0·4	·106666	**0·9**	·240000	**1 4**	373333	**1·9**	·506666	**2·4**	640000	**2·9**	·773333	**3·4**	·906666		
0·5	·133333	**1·0**	·266666	**1 5**	·400000	**2·0**	·533333	**2 5**	·666666	**3·0**	·800000	**3·5**	·933333		

TABLE IV-K.

Mean place of Rahu at commencement of Kaliyuga and at Mesha Sankranti at the beginning of every century—B.C. 3201—A.D. 2000.

B.C.	Degrees.	Kaliyuga.	B.C.	Degrees.	Kaliyuga.	A.D.	Degrees.	Kaliyuga.
3102	201·6952	0	1601	304·9379	1501	100	155·8857	3201
3201	317·1635	−99	1501	169·1118	1601	200	20·0591	3301
						300	244·2825	3401
						400	108·4059	3501
3101	182·3369	1	1401	33·2847	1701	500	332·5793	3601
3001	46·5108	101	1301	257·4581	1801			
2901	270·6887	201	1201	121·6315	1901	600	196·7527	3701
2801	134·8571	301	1101	345·8049	2001	700	60·9261	3801
2701	359·0345	401	1001	209·9783	2101	800	285·0995	3901
						900	149·2729	4001
						1000	13·4463	4101
2601	223·2039	501	901	74·1517	2201			
2501	87·3773	601	801	298·3251	2301	1100	237·6197	4201
2401	311·5507	701	701	162·4985	2401	1200	101·7931	4301
2301	175·7241	801	601	26·6719	2501	1300	325·9665	4401
2201	39·8975	901	501	250·8453	2601	1400	190·1399	4501
						1500	54·3133	4601
2101	264·0709	1001	401	115·0187	2701	1600	278·4867	4701
2001	128·2443	1101	301	339·1921	2801	1700	142·6601	4801
1901	352·4177	1201	201	203·3655	2901	1800	6·8335	4901
1801	216·5911	1301	101	67·5379	3001	1900	231·0069	5001
1701	80·7645	1401	1	291·7123	3101	2000	95·1803	5101

N.B.—0 Kaliyuga, as a civil Solar year began on February 15·5792, B.C. 3102 whereas 0 Kaliyuga, as the starting point of Indian planetary longitudes, was February 17·75, B.C. 3102. The mean place of Rahu at the former moment was 201·6952° and at the latter 201·5802°.

Mean motion of Rahu in sidereal longitude (Indian) for odd years of a century and for multiples of 100 years.

Years.	Degrees.	Years	Degrees	Years	Degrees.	Years.	Degrees.	Years.	Degrees.
1	19·3583	26	143·3149	51	267·2716	76	31·2282	200	271·6532
2	38·7165	27	162·6732	52	286·6298	77	50·5865	300	47·4798
3	58·0748	28	182·0314	53	305·9881	78	69·9447	400	183·3064
4	77·4331	29	201·3897	54	325·3464	79	89·3030	500	319·1830
5	96·7913	30	220·7480	55	344·7046	80	108·6613	600	94·9596
6	116·1496	31	240·1062	56	4·0629	81	128·0195	700	230·7862
7	135·5079	32	259·4645	57	23·4212	82	147·3778	800	6·6128
8	154·8661	33	278·8228	58	42·7794	83	166·7361	900	142·4394
9	174·2244	34	298·1810	59	62·1377	84	186·0943	1000	278·2660
10	193·5827	35	317·5393	60	81·4960	85	205·4526	2000	196·5320
11	212·9409	36	336·8976	61	100·8542	86	224·8109	3000	114·7980
12	232·2992	37	356·2558	62	120·2125	87	244·1691	4000	33·0640
13	251·6575	38	15·6141	63	139·5707	88	263·5274	5000	311·3300
14	271·0157	39	34·9724	64	158·9290	89	282·8857		
15	290·3740	40	54·3306	65	178·2873	90	302·2439		
16	309·7323	41	73·6889	66	197·6455	91	321·6021		
17	329·0905	42	93·0472	67	217·0038	92	340·9605		
18	348·4488	43	112·4054	68	236·3621	93	0·3187		
19	7·8070	44	131·7637	69	255·7203	94	19·6769		
20	27·1653	45	151·1220	70	275·0786	95	39·0352		
21	46·5236	46	170·4802	71	294·4369	96	58·3935		
22	65·8818	47	189·8385	72	313·7951	97	77·7518		
23	85·2401	48	209·1968	73	333·1534	98	97·1100		
24	104·5984	49	228·5550	74	352·5117	99	116·4683		
25	123·9566	50	247·9133	75	11·8699	100	135·8266		

N.B.—Rahu's motion is backward, not forward. Therefore, in deducing the place of Rahu for so many years or so many days (see below) subsequent to a given moment, the motion of Rahu for the required interval should be deducted from, (not added to), the given place. Thus: required to deduce from the place of Rahu at 0 Kaliyuga his place one day after Mesha Sankranti, A.D 1909. From the given place, 201·6952° deduct motion for 5010 years and one day, i.e., 5000 years (311·3300°) + 10 years (193·5827°) + 1 day (·0530°). Result 56·7295°.

Mean motion of Rahu for every 10 days and for fractions of a day.

Day.	Degrees.	Days.	Degrees.	Days.	Degrees.	Days.	Degrees.	Days	Degrees.	Days.	Degrees.	Days.	Degrees.
·1	·0053	1	·0530	10	0·5300	100	5·2999	190	10·0698	280	14·8397	365	19·3446
·2	·0106	2	·1060	20	1·0600	110	5·8299	200	10·5998	290	15·3696	366	19·3979
·3	·0159	3	·1590	30	1·5900	120	6·3599	210	11·1297	300	15·8996		
·4	·0212	4	·2120	40	2·1199	130	6·8899	220	11·6597	310	16·4296		
·5	·0265	5	·2650	50	2·6499	140	7·4199	230	12·1897	320	16·9596		
·6	·0318	6	·3180	60	3·1799	150	7·9498	240	12·7197	330	17·4896		
·7	·0371	7	·3710	70	3·7099	160	8·4798	250	13·2497	340	18·0196		
·8	·0424	8	·4240	80	4·2399	170	9·0098	260	13·7797	350	18·5496		
·9	·0477	9	·4770	90	4·7699	180	9·5398	270	14·3097	360	19·0796		

KEY TO TABLE IV-L.

[This key will enable the reader to find out readily where the eclipses of any given year are to be found in Table IV-L which is spread over 14 pages. The key is necessary because certain years, shown here in italics occur twice in Table IV-L Thus the eclipses for the year A D 1256 are entered twice, once in the same lines with the eclipses of A D 26, and again in line with the eclipses of A.D 44 As the same information is given in both places, it does not matter in which of the two it is looked up]

A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.		A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.
1	59	117	174	192	250	308	366	424	482	540	**1**	558	616	674	731	789	847	865	923	981
2	60	117	175	193	251	309	367	425	483	541	**2**	559	617	674	732	790	848	866	924	982
3	60	118	176	194	252	310	368	426	484	542	**3**	560	618	675	733	791	849	867	925	983
4	61	119	177	195	253	311	369	427	485	543	**4**	561	619	676	734	792	850	868	926	984
5	62	120	178	196	254	312	370	428	486	544	**5**	562	619	677	735	793	851	869	927	985
6	63	121	179	197	255	313	371	429	487	545	**6**	563	620	678	736	794	852	870	928	986
7	65	123	181	199	256	314	372	430	488	546	**7**	564	622	680	738	795	853	871	929	987
8	66	124	182	200	257	315	373	431	489	547	**8**	565	623	681	739	796	854	872	930	988
9	67	125	182	200	258	316	374	432	490	548	**9**	566	624	682	739	797	855	873	931	989
10	68	125	183	201	259	317	375	433	491	549	**10**	567	625	683	740	798	856	874	932	990
11	69	126	184	202	260	318	376	434	492	550	**11**	568	626	683	741	799	857	875	933	991
12	70	127	185	203	261	319	377	435	493	551	**12**	569	627	684	742	800	858	876	934	992
13	70	128	186	204	262	320	378	436	494	552	**13**	570	628	685	743	801	859	877	935	993
14	71	129	187	205	263	321	379	437	495	553	**14**	571	628	686	744	802	860	878	936	994
15	73	131	189	207	265	322	380	438	496	554	**15**	572	630	688	746	804	861	879	937	995
16	74	132	190	208	265	323	381	439	497	555	**16**	573	631	689	747	804	862	880	938	996
17	75	133	190	209	266	324	382	440	498	556	**17**	574	632	690	748	805	863	881	939	997
18	76	134	191	209	267	325	383	441	499	557	**18**	575	633	691	749	806	864	882	940	998
19	77	135	*192*	210	268	326	384	442	500	*558*	**19**	576	634	692	749	807	*865*	883	941	999
20	78	135	*193*	211	269	327	385	443	501	*559*	**20**	577	635	693	750	808	*866*	884	942	1000
21	79	136	*194*	212	270	328	386	444	502	*560*	**21**	578	636	693	751	809	*867*	885	943	1001
22	79	137	*195*	213	271	329	387	445	503	*561*	**22**	579	637	694	752	810	*868*	886	944	1002
23	80	138	*196*	214	272	330	388	446	504	*562*	**23**	580	638	695	753	811	*869*	887	945	1003
24	81	139	*197*	215	273	331	389	447	505	*563*	**24**	581	638	696	754	812	*870*	888	946	1004
25	82	140	*198*	216	274	332	390	448	506	*564*	**25**	582	639	697	755	813	*871*	889	947	1005
26	84	142	*200*	218	275	333	391	449	507	*565*	**26**	583	641	699	757	814	*872*	890	948	1006
27	85	143	*200*	219	276	334	392	450	508	*566*	**27**	584	642	700	758	815	*873*	891	949	1007
28	86	144	*201*	219	277	335	393	451	509	*567*	**28**	585	643	701	758	816	*874*	892	950	1008
29	87	144	*202*	220	278	336	394	452	510	*568*	**29**	586	644	702	759	817	*875*	893	951	1009
30	88	145	*203*	221	279	337	395	453	511	*569*	**30**	587	645	703	760	818	*876*	894	952	1010
31	89	146	*204*	222	280	338	396	454	512	*570*	**31**	588	646	703	761	819	*877*	895	953	1011
32	89	147	*205*	223	281	339	397	455	513	*571*	**32**	589	646	704	762	820	*878*	896	954	1012
33	90	148	*206*	224	282	340	398	456	514	*572*	**33**	590	647	705	763	821	*879*	897	955	1013
34	92	150	*208*	226	284	341	399	457	515	*573*	**34**	591	649	707	765	823	*880*	898	956	1014
35	93	151	*209*	227	284	342	400	458	516	*574*	**35**	592	650	708	766	823	*881*	899	957	1015
36	94	152	*209*	228	285	343	401	459	517	*575*	**36**	593	651	709	767	824	*882*	900	958	1016
37	95	153	*210*	228	286	344	402	460	518	*576*	**37**	594	652	710	768	825	*883*	901	959	1017
38	96	154	*211*	229	287	345	403	461	519	*577*	**38**	595	653	711	768	826	*884*	902	960	1018
39	97	154	*212*	230	288	346	404	462	520	*578*	**39**	596	654	711	769	827	*885*	903	961	1019
40	98	155	*213*	231	289	347	405	463	521	*579*	**40**	597	655	712	770	828	*886*	904	962	1020
41	98	156	*214*	232	290	348	406	464	522	*580*	**41**	598	656	713	771	829	*887*	905	963	1021
42	99	157	*215*	233	291	349	407	465	523	*581*	**42**	599	657	714	772	830	*888*	906	964	1022
43	100	158	*216*	234	292	350	408	466	524	*582*	**43**	600	657	715	773	831	*889*	907	965	1023
44	102	160	*218*	236	293	351	409	467	525	*583*	**44**	601	659	717	775	833	*890*	908	966	1024
45	103	161	*219*	237	294	352	410	468	526	*584*	**45**	602	660	718	776	833	*891*	909	967	1025
46	104	162	*219*	237	295	353	411	469	527	*585*	**46**	603	661	719	776	834	*892*	910	968	1026
47	105	163	*220*	238	296	354	412	470	528	*586*	**47**	604	662	720	777	885	*893*	911	969	1027
48	106	163	*221*	239	297	355	413	471	529	*587*	**48**	605	663	721	778	836	*894*	912	970	1028
49	107	164	*222*	240	298	356	414	472	530	*588*	**49**	606	664	721	779	887	*895*	913	971	1029
50	107	165	*223*	241	299	357	415	473	531	*589*	**50**	607	665	722	780	838	*896*	914	972	1030
51	108	166	*224*	242	300	358	416	474	532	*590*	**51**	608	665	723	781	839	*897*	915	973	1031
52	109	167	*225*	243	301	359	417	475	533	*591*	**52**	609	666	724	782	840	*898*	916	974	1032
53	111	169	*227*	245	303	360	418	476	534	*592*	**53**	610	668	726	784	842	*899*	917	975	1033
54	112	170	*228*	246	303	361	419	477	535	*593*	**54**	611	669	727	785	842	*900*	918	976	1034
55	113	171	*228*	247	304	362	420	478	536	*594*	**55**	612	670	728	786	843	*901*	919	977	1035
56	114	172	*229*	247	305	363	421	479	537	*595*	**56**	613	671	729	787	844	*902*	920	978	1036
57	115	172	*230*	248	306	364	422	480	538	*596*	**57**	614	672	730	787	845	*903*	921	979	1037
58	116	173	*231*	249	307	365	423	481	539	*597*	**58**	615	673	730	788	846	*904*	922	980	1088

KEY TO TABLE IV-L—*cont*

	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.
1	1039	1097	1155	1213	1231	1288	1346	1404	1462	1520
2	1040	1098	1156	1214	1232	1289	1347	1405	1463	1521
3	1041	1099	1157	1214	1232	1290	1348	1406	1464	1522
4	1042	1100	1158	1215	1233	1291	1349	1407	1465	1523
5	1043	1101	1158	1216	1234	1292	1350	1408	1466	1524
6	1044	1102	1159	1217	1235	1293	1351	1409	1467	1525
7	1045	1103	1161	1219	1237	1295	1353	1410	1468	1526
8	1046	1104	1162	1220	1238	1296	1353	1411	1469	1527
9	1047	1105	1163	1221	1239	1297	1354	1412	1470	1528
10	1048	1106	1164	1222	1240	1297	1355	1413	1471	1529
11	1049	1107	1165	1223	1241	1298	1356	1414	1472	1530
12	1050	1108	1166	1223	1242	1299	1357	1415	1473	1531
13	1051	1109	1167	1224	1242	1300	1358	1416	1474	1532
14	1052	1110	1167	1225	1243	1301	1359	1417	1475	1533
15	1053	1111	1169	1227	1245	1303	1361	1418	1476	1534
16	1054	1112	1170	1228	1246	1304	1362	1419	1477	1535
17	1055	1113	1171	1229	1247	1305	1362	1420	1478	1536
18	1056	1114	1172	1230	1248	1306	1363	1421	1479	1537
19	1057	1115	1173	*1231*	1249	1307	1364	1422	1480	*1538*
20	1058	1116	1174	*1233*	1250	1307	1365	1423	1481	*1539*
21	1059	1117	1175	*1233*	1250	1308	1366	1424	1482	*1540*
22	1060	1118	1176	*1233*	1251	1309	1367	1425	1483	*1541*
23	1061	1119	1177	*1234*	1252	1310	1368	1426	1484	*1542*
24	1062	1120	1177	*1235*	1253	1311	1369	1427	1485	*1543*
25	1063	1121	1178	*1236*	1254	1312	1370	1428	1486	*1544*
26	1064	1122	1180	*1238*	1256	1314	1372	1429	1487	*1545*
27	1065	1123	1181	*1239*	1257	1315	1372	1430	1488	*1546*
28	1066	1124	1182	*1240*	1258	1315	1373	1431	1489	*1547*
29	1067	1125	1183	*1241*	1259	1316	1374	1432	1490	*1548*
30	1068	1126	1184	*1242*	1260	1317	1375	1433	1491	*1549*
31	1069	1127	1185	*1243*	1260	1318	1376	1434	1492	*1550*
32	1070	1128	1185	*1243*	1261	1319	1377	1435	1493	*1551*
33	1071	1129	1186	*1244*	1262	1320	1378	1436	1494	*1552*
34	1072	1130	1188	*1245*	1264	1322	1380	1437	1495	*1553*
35	1073	1131	1189	*1246*	1265	1323	1380	1438	1496	*1554*
36	1074	1132	1190	*1247*	1266	1324	1381	1439	1497	*1555*
37	1075	1133	1191	*1248*	1267	1325	1382	1440	1498	*1556*
38	1076	1134	1192	*1249*	1268	1325	1383	1441	1499	*1557*
39	1077	1135	1193	*1250*	1269	1326	1384	1442	1500	*1558*
40	1078	1136	1194	*1251*	1269	1327	1385	1443	1501	*1559*
41	1079	1137	1195	*1252*	1270	1328	1386	1444	1502	*1560*
42	1080	1138	1196	*1253*	1271	1329	1387	1445	1503	*1561*
43	1081	1139	1196	*1254*	1272	1330	1388	1446	1504	*1562*
44	1082	1140	1198	*1256*	1274	1332	1390	1447	1505	*1563*
45	1083	1141	1199	*1257*	1275	1333	1390	1448	1506	*1564*
46	1084	1142	1200	*1258*	1276	1334	1391	1449	1507	*1565*
47	1085	1143	1201	*1259*	1277	1334	1392	1450	1508	*1566*
48	1086	1144	1202	*1260*	1278	1335	1393	1451	1509	*1567*
49	1087	1145	1203	*1260*	1279	1336	1394	1452	1510	*1568*
50	1088	1146	1204	*1261*	1279	1337	1395	1453	1511	*1569*
51	1089	1147	1204	*1262*	1280	1338	1396	1454	1512	*1570*
52	1090	1148	1205	*1263*	1281	1339	1397	1455	1513	*1571*
53	1091	1149	1207	*1265*	1283	1341	1399	1456	1514	*1572*
54	1092	1150	1208	*1266*	1284	1342	1399	1457	1515	*1573*
55	1093	1151	1209	*1267*	1285	1343	1400	1458	1516	*1574*
56	1094	1152	1210	*1268*	1286	1344	1401	1459	1517	*1575*
57	1095	1153	1211	*1269*	1287	1344	1402	1460	1518	*1576*
58	1096	1154	1212	*1269*	1288	1345	1403	1461	1519	*1577*

	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.	A.D.
1	1538	1596	1654	1712	1770	1827	1885	1903	1961
2	1539	1597	1655	1713	1771	1828	1886	1904	1962
3	1540	1598	1656	1714	1771	1829	1887	1905	1963
4	1541	1599	1657	1715	1772	1830	1888	1906	1964
5	1542	1600	1658	1716	1773	1831	1889	1907	1965
6	1543	1601	1659	1717	1774	1832	1890	1908	1966
7	1544	1602	1660	1718	1776	1834	1892	1910	1967
8	1545	1603	1661	1719	1777	1835	1893	1911	1968
9	1546	1604	1662	1720	1778	1836	1893	1911	1969
10	1547	1605	1663	1721	1779	1836	1894	1912	1970
11	1548	1606	1664	1722	1780	1837	1895	1913	1971
12	1549	1607	1665	1723	1781	1838	1896	1914	1972
13	1550	1608	1666	1724	1781	1839	1897	1915	1973
14	1551	1609	1667	1725	1782	1840	1898	1916	1974
15	1552	1610	1668	1726	1784	1842	1900	1918	1976
16	1553	1611	1669	1727	1785	1843	1901	1919	1976
17	1554	1612	1670	1728	1786	1844	1901	1920	1977
18	1555	1613	1671	1729	1787	1845	1902	1920	1978
19	1556	1614	1672	1730	1788	1846	*1903*	1921	1979
20	1557	1615	1673	1731	1789	1846	*1904*	1922	1980
21	1558	1616	1674	1732	1790	1847	*1905*	1923	1981
22	1559	1617	1675	1733	1790	1848	*1906*	1924	1982
23	1560	1618	1676	1734	1791	1849	*1907*	1925	1983
24	1561	1619	1677	1735	1792	1850	*1908*	1926	1984
25	1562	1620	1678	1736	1793	1851	*1909*	1927	1985
26	1563	1621	1679	1737	1795	1853	*1911*	1929	1986
27	1564	1622	1680	1738	1796	1854	*1911*	1930	1987
28	1565	1623	1681	1739	1797	1855	*1912*	1930	1988
29	1566	1624	1682	1740	1798	1855	*1913*	1931	1989
30	1567	1625	1683	1741	1799	1856	*1914*	1932	1990
31	1568	1626	1684	1742	1799	1857	*1915*	1933	1991
32	1569	1627	1685	1743	1800	1858	*1916*	1934	1992
33	1570	1628	1686	1744	1801	1859	*1917*	1935	1993
34	1571	1629	1687	1745	1803	1861	*1919*	1937	1995
35	1572	1630	1688	1746	1804	1862	*1920*	1938	1995
36	1573	1631	1689	1747	1805	1863	*1920*	1939	1996
37	1574	1632	1690	1748	1806	1864	*1921*	1939	1997
38	1575	1633	1691	1749	1807	1864	*1922*	1940	1998
39	1576	1634	1692	1750	1808	1865	*1923*	1941	1999
40	1577	1635	1693	1751	1809	1866	*1924*	1942	2000
41	1578	1636	1694	1752	1809	1867	*1925*	1943	2001
42	1579	1637	1695	1753	1810	1868	*1926*	1944	2002
43	1580	1638	1696	1754	1811	1869	*1927*	1945	2003
44	1581	1639	1697	1755	1813	1871	*1929*	1947	2004
45	1582	1640	1698	1756	1814	1872	*1930*	1948	2005
46	1583	1641	1699	1757	1815	1873	*1930*	1948	2006
47	1584	1642	1700	1758	1816	1874	*1931*	1949	2007
48	1585	1643	1701	1759	1817	1874	*1932*	1950	2008
49	1586	1644	1702	1760	1818	1875	*1933*	1951	2009
50	1587	1645	1703	1761	1818	1876	*1934*	1952	2010
51	1588	1646	1704	1762	1819	1877	*1935*	1953	2011
52	1589	1647	1705	1763	1820	1878	*1936*	1954	2012
53	1590	1648	1706	1764	1822	1880	*1938*	1956	2014
54	1591	1649	1707	1765	1823	1881	*1939*	1957	2014
55	1592	1650	1708	1766	1824	1882	*1939*	1958	2015
56	1593	1651	1709	1767	1825	1883	*1940*	1958	2016
57	1594	1652	1710	1768	1826	1883	*1941*	1959	2017
58	1595	1653	1711	1769	1827	1884	*1942*	1960	2018

TABLE IV-L.

Cycles of recurrence of Eclipses—Solar and Lunar.

N.B.—(1) Lines containing solar eclipses are marked N and those containing lunar eclipses are marked F, in each A.D. year the days when eclipses occurred are indicated in plain type, in italic or by starred figures. All these figures refer to days of the Indian Solar year and may be rendered into days of the English calendar with the help of Table IV-M.

(2) Starred figures indicate solar eclipses visible in India.

(3) *Italics* mean that an eclipse on that occasion is not recorded in *L'Art de Verifier les dates* though it may have occurred in remote parts of the world and as such may find mention in Oppolzer—see pages 135—150 of Text.

(1)	(2) Sun from node.	(3) Successive differences.	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
			Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.		Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.
		0	**57** 334·1	**115** 283·0	**173** 241·9	**191** 252·6	**249** 211·5	**307** 170·4	**365** 129·3	**423** 88·2	**481** 47·1		**539** 6·0	**557** 16·7	**614** 340·8	**672** 299·7	**730** 258·6	**788** 217·5	**846** 176·4	**864** 187·1	**922** 146·0	**980** 104·9
	Cyclic variation; add algebraically to fig. in col. 2.		−·08	−·17	−·25	+·22	+·14	+·05	−·03	−·12	−·20		−·29	+·18	+·10	+·01	−·07	−·16	−·24	+·28	+·15	+·06
			Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +10·7	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1		Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +10·7	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +10·7	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1
		A.D. 1	**59**	**117**	**174**	**192**	**250**	**308**	**366**	**424**	**482**		**540**	**558**	**616**	**674**	**731**	**789**	**847**	**865**	**923**	**981**
N.	183°·41	87·7*	46·6*	5·5*	329·6	340·3*	299·2	258·1*	217·0	175·9	134·8	N.	93·7	104·4	63·3*	22·1*	346·3	305·2*	264·1	274·8	233·7*	192·6
F.	168°·07	102·4	61·3	20·2	—344·3	—355·0	—313·9	—272·8	—231·7	190·6	149·5	F.	108·4	119·1	78·0	36·9	—361·1	—320·0	—278·9	—289·6	—248·5	207·4
F.	14°·73	250·1	209·0	167·9	126·8	137·5	96·4	55·3	14·2	338·3	297·2	F.	256·1	266·8	225·7	184·6	143·5	102·4	61·3	72·0	30·9	—355·0
N.	359°·38	—264·9	—223·8*	182·7	141·6*	152·3	111·2	70·1	29·0	—353·1	—312·0	N.	270·9	—281·6	—240·5*	199·4*	158·8*	117·2	76·1*	86·8*	45·7	4·6*
		A.D. 2	**60**		**175**	**193**	**251**	**309**	**367**	**425**	**483**		**541**	**559**	**617**		**732**	**790**	**848**	**866**	**924**	**982**
F.	190°·70	62·0	20·9	345·1	304·0	314·7	273·6	232·5	191·4	150·3	109·2	F.	68·0	78·8	37·7	—361·7	320·6	279·5	238·4	249·1	208·0	166·9
N.	175°·36	76·8	35·7	—359·9	—318·8*	—329·5	—288·4*	—247·3	—206·2*	165·1*	124·0	N.	82·9*	93·6*	52·5	11·2	—335·4	—294·3*	—253·2	—263·9*	—222·8	181·7*
F.	6°·67	239·2	198·1	157·0	115·9	126·6	85·5	44·4	3·3	327·4	286·3	F.	245·2	255·9	214·8	173·7	132·6	91·5	50·4	61·1	20·0	344·2
N.	351°·34	—254·0*	212·9*	171·8*	130·7	141·4	100·3*	59·2	18·1*	—342·2	—301·1*	N.	—260·0	270·7	229·6*	188·3	147·2*	106·1*	65·0	75·7*	34·6	—358·8
		A.D. 3		**118**	**176**	**194**	**252**	**310**	**368**	**426**	**484**		**542**	**560**	**618**	**675**	**733**	**791**	**849**	**867**	**925**	**983**
N.	197°·93	36·4	—360·5	319·4	278·4	289·0	247·9	206·8	165·7	124·6	83·5	N.	42·4	53·1	12·0*	336·1	295·0	253·9	212·8	223·5	182·4	141·3
F.	182°·65	51·1	10·1	334·2	293·1	303·8	262·7	221·6	180·5	139·4	98·3	F.	57·2	67·9	26·8	—350·9	309·8	268·7	227·6	238·3	197·2	156·1
N.	167°·32	65·9	24·8	—348·9	—307·8	—318·5	—277·4	—236·3*	195·2	154·1*	103·0	N.	71·9	82·6	41·5	0·4	—324·5	—283·4	—242·3	—253·0	211·9	170·8
N.	13°·96	213·6	172·5	131·4	90·3	101·0	59·9	18·8	342·9	301·8	260·7	N.	219·6	230·3	189·2	148·1	107·0	65·9	24·8	35·5	—359·6	318·5
F.	358°·63	228·3	187·3	147·2	105·1	115·8	74·7	33·6	—357·7	316·6	275·5	F.	234·4	245·1	204·0	162·9	121·8	80·7	39·9	50·3	9·2	333·2
N.	343°·29	—243·1	202·0	161·9	119·8	130·5	90·4	48·3	7·2	—331·3	—290·2	N.	—249·1	—259·8*	—218·7*	177·6	136·5	95·4	54·3	65·0	23·9	—348·0
		A.D. 4	**61**	**119**	**177**	**195**	**253**	**311**	**369**	**427**	**485**		**543**	**561**	**619**	**676**	**734**	**792**	**850**	**868**	**926**	**984**
N.	189°·94	25·5	—349·6	308·5*	267·4	278·1	237·0	195·9	154·8	113·7*	72·6	N.	81·5*	42·2*	1·1	325·2	284·1*	243·0*	201·9*	212·6	171·5	130·4*
F.	174°·60	40·2	364·3	—323·2	—282·1	—292·8	—251·7	—210·6	169·5	128·4	87·3	F.	46·2	56·9	15·8	—339·9	—298·8	—257·7	—216·6	—227·8	186·2	145·1
N.	5°·92	202·7	161·6	120·5	79·4	90·1	49·0*	7·9	332·0	290·9	249·8*	N.	208·7*	219·4	178·3	137·2	96·1*	55·0	13·9*	24·6	348·7*	307·6
F.	350°·58	—217·4	176·4	135·3	94·2	104·9	63·8	22·7	—346·8	—305·7	—264·6	F.	—223·5	—234·2	193·1	152·0	110·9	69·8	28·7	39·4	—363·5	—322·4
		A.D. 5	**62**	**120**	**178**	**196**	**254**	**312**	**370**	**428**	**486**		**544**	**562**		**677**	**735**	**793**	**851**	**869**	**927**	**985**
N.	181°·89	14·6	338·7*	297·6	256·5*	267·2	226·1	185·0	143·9*	102·8	61·7	N.	20·6*	31·3*	—355·4*	314·3*	273·2*	232·1	191·0	201·7*	160·6*	119·5
F.	166°·56	29·3	—353·5	—312·4	—271·3	—282·0	—240·9	199·8	158·7	117·6	76·5	F.	35·4	46·1	5·0	—329·1	—287·0	—246·9	205·8	216·5	175·4	134·3
F.	13°·21	177·0	135·9	94·8	53·7	64·4	23·3	347·4	306·3	265·2	224·1	F.	183·0	193·7	152·6	111·5	70·4	29·3	—353·4	—364·1	323·0	281·9
N.	357°·87	191·8*	150·7	109·6*	68·5*	79·2*	38·1	—362·2	—321·1*	—280·0	—239·9*	N.	197·8	—208·5*	167·4*	126·2*	85·1	44·1*	3·1	13·8	—337·7*	—296·6*
F.	189°·18	—354·2	313·1	272·0	230·9	241·6	200·5	159·4	118·3	77·2	36·1	F.	—360·2	5·8	329·8	288·7	247·6	206·5	165·4	176·1	135·0	93·9
		A.D. 6	**63**	**121**	**179**	**197**	**255**	**313**	**371**	**429**	**487**		**545**	**563**	**620**	**678**	**736**	**794**	**852**	**870**	**928**	**986**
N.	178°·85	3·7	—327·8	—286·7	—245·6	—256·3	—215·2	174·1*	133·0	91·9	50·8*	N.	9·7*	20·4	—344·5	—303·4	—262·3	—221·2	180·1	190·8	149·7*	108·6
F.	5°·16	166·1	125·0	83·9	42·8	53·5	12·4	336·5	295·4	254·3	213·2	F.	172·1	182·8	141·7	100·6	59·5	18·4	342·5	—358·2	312·1	271·0
N.	349°·83	180·9*	139·8*	98·7	57·6	68·3	27·2	—351·8*	—310·2	—269·1*	—228·0*	N.	186·9*	197·6*	156·5	115·4*	74·3	33·2	—357·3	2·8	—326·9	—285·8
			64	**122**	**180**	**198**									**621**	**679**	**737**					(America.)
N.	196°·47	328·6	287·5	246·4	205·3	216·0	174·9	133·8	92·7	51·6	10·5*	N.	334·6	345·3	304·2	263·1	222·0*	180·9	139·8	150·5	109·4	68·3
F.	181°·14	343·8	302·3	261·2	220·1	230·8	189·7	148·6	107·5	66·4	25·3	F.	349·4	—360·1	319·0	277·9	236·8	195·7	154·6	165·3	124·2	83·1
	166°·81	—358·1	—317·0	—275·9	—234·8	—245·5	204·4	163·3	122·2*	81·1	40·0	N.	—364·1	9·6	—333·7	—292·6	—251·5	210·4	168·3*	180·0	138·9	97·8

TABLE IV-L—cont.

Cycles of recurrence of Eclipses—Solar and Lunar—cont.

	Sun from node.	Successive differences.	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
		Yrs. Dys. 0	Yrs. Dys. 1038 68·8	Yrs. Dys. 1096 22·7	Yrs. Dys. 1153 346·8	Yrs. Dys. 1211 305·7	Yrs. Dys. 1229 316·4	Yrs. Dys. 1287 275·3	Yrs. Dys. 1345 234·1	Yrs. Dys. 1403 193·1	Yrs. Dys. 1461 152·0
		Cyclic variation; add algebraically to fig. in col. 2.	−·02	−·11	−·19	−·28	+·19	+·11	+·02	−·06	−·15
			Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +10·7	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1
		A.D. 1	**1039**	**1097**	**1155**	**1213**	**1231**	**1288**	**1346**	**1404**	**1462**
N.	183°·41	87·7*	151·5	110·4	69·3*	28·2*	38·9	−363·0*	321·8*	280·7*	239·6*
F.	168°·07	102·2	166·3	125·2	84·1	43·0	53·7	12·6	−336·6	−295·5	254·4
F.	14°·72	250·1	313·9	272·8	231·7	190·6	201·3	160·2	119·0	77·9	36·8
N.	359°·38	−264·9	−328·7*	−287·6*	−246·5*	205·4	216·1	175·0*	133·8*	92·7	51·6*
		A.D. 2	**1040**	**1098**	**1156**	**1214**	**1232**	**1289**	**1347**	**1405**	**1463**
F.	190°·70	62·0	125·8	84·7	43·6	2·5	13·2	337·4	296·2	255·0	213·9
N.	175°·36	76·8	140·6	99·5	58·4*	17·3	28·0*	352·2	−310·9	−269·8	−228·7*
F.	6°·67	239·2	303·1	262·0	220·9	179·8	190·5	149·2	108·0	66·9	25·8
N.	351°·34	−254·0*	−317·7	−276·6	−235·5	194·4*	205·1	164·0*	122·8*	81·7*	40·6*
		A.D. 3	**1041**	**1099**	**1157**			**1290**	**1348**	**1406**	**1464**
N.	197°·99	36·4	100·2	59·1	18·1	342·3	−352·9	311·8	270·8	229·7	188·6
F.	182°·65	51·1	115·0	73·9	32·8	−356·9	2·3	326·4	285·3	244·2	204·1
N.	167°·32	65·9	129·7	88·6	47·5	6·4	17·1	−341·2	−300·0	−258·9	−217·8
N.	13°·96	213·6	277·4	236·3	195·2	154·1	164·8	123·7	82·6	41·5	0·4
F.	358°·63	228·3	292·2	251·1	210·0	168·9	179·6	138·5	97·4	56·3	15·2
N.	343°·29	−243·1	−306·9	−265·8	−224·7	183·6	194·3*	153·2*	112·1	71·0*	29·9
		A.D. 4	**1042**	**1100**	**1158**	**1215**	**1233**	**1291**	**1349**	**1407**	**1465**
N.	189°·94	25·5	89·3*	48·2*	7·1	331·2*	341·9	300·8*	259·7	218·6	177·5
F.	174°·60	40·2	104·0	62·9	21·8	−345·9	−356·6	−315·5	−274·4	−233·3	192·2
N.	5°·92	202·7	266·5*	225·4	184·3	143·2	153·9*	112·8	71·4	30·6*	−354·7
F.	350°·58	−217·4	−281·3	−240·2	199·1	158·0	168·7	127·5	86·5	45·4	4·3
		A.D. 5	**1043**	**1101**		**1216**	**1234**	**1292**	**1350**	**1408**	**1466**
N.	181°·89	14·6	78·4*	37·3*	−361·4	320·3	331·0*	289·9*	248·8*	207·7*	166·6
F.	166°·56	29·3	93·2	52·1	11·0	−335·1	−345·8	−304·7	−263·6	−222·5	181·4
F.	13°·21	177·0	240·8	199·7	158·6	117·5	128·2	87·1	45·9	4·8	328·9
N.	357°·87	191·8*	−255·5*	−214·4*	173·3	132·2*	142·9*	101·8	60·7	19·6	−343·7*
F.	189°·18	354·2	52·8	11·7	335·8	294·7	305·4	264·3	223·2	182·1	141·0
		A.D. 6	**1044**	**1102**	**1159**	**1217**	**1235**	**1293**	**1351**	**1409**	**1467**
N.	173°·85	3·7	67·5*	26·4*	−350·5	−309·4*	−320·1	−279·0*	−237·9	196·8*	155·7
F.	5°·16	166·1	229·9	188·8	147·7	106·6	117·3	76·2	35·1	−359·2	318·1
N.	349°·88	180·9*	−244·7*	203·6	162·5*	121·4*	132·1*	91·0*	49·9	8·8	−332·9
				(America)	**1160**	**1218**	**1236**	**1294**	**1352**		(Penumbral)
N.	196°·47	328·6	27·2*	−351·3*	310·2*	269·1	279·8	238·7	197·6	156·5	115·4
F.	181°·14	343·3	42·0	0·9	325·0	283·9	294·6	253·5	212·4	171·3	130·2
N.	166°·81	−358·1	56·7	15·6	−339·7	−298·6	−309·3	−268·2	−227·1	186·0	144·9

	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
	Yrs. Dys. 1519 110·9	Yrs. Dys. 1537 121·6	Yrs. Dys. 1595 80·5	Yrs. Dys. 1653 39·4	Yrs. Dys. 1710 368·6	Yrs. Dys. 1768 322·4	Yrs. Dys. 1826 281·3	Yrs. Dys. 1884 240·2	Yrs. Dys. 1902 250·9	Yrs. Dys. 1960 209·8
	−·23	+·24	+·16	+·07	+·00	−·08	−·17	−·25	+·22	+·14
	Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +10·7	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +10·7	Yrs. Dys. +58 −41·1
	1520	**1538**	**1596**	**1654**	**1712**	**1770**	**1828**	**1885**	**1903**	**1961**
N.	198·5	209·2	168·1*	127·0*	85·9*	44·8*	3·7*	327·8	338·5*	297·4
F.	213·3	−224·0	182·9	141·8	100·7	59·6	18·5	−348·6	−353·3	−312·2
F.	−360·9	6·4	330·5	289·4	248·3	207·2	166·1	125·0	135·7	94·6
N.	10·5*	21·2	−345·3*	−304·2*	−263·1*	−222·0*	180·9*	139·8	150·5	109·4
	1521	**1539**	**1597**	**1655**	**1713**	**1771**		**1886**	**1904**	**1962**
F.	172·8	183·5	142·4	101·3	60·2	19·1	348·3	302·2	312·9	271·8
N.	187·6	198·3*	157·2	116·1*	75·0	33·9	−358·1	−317·0	−327·7	−286·6
F.	350·0	−360·7	319·6	278·5	237·4	196·3	155·2	114·0	124·7	83·6
N.	−364·8	10·2*	−334·4	−293·3	−252·2	211·1	170·0*	128·8*	139·5	98·4
	1522	**1540**	**1598**	**1656**	**1714**		**1829**	**1887**	**1905**	**1963**
N.	147·5	158·2	117·1	76·0	34·9	−356·1	315·0	276·9	287·6	246·5
F.	162·0	172·7	131·6	90·5	49·4	8·3	332·4	291·3	302·0	260·9
N.	176·7	187·4	146·3	105·2	64·1	23·0	−347·1	−306·0	−316·7	−275·6
N.	324·5	335·2	294·1	253·0	211·9	170·8	129·7	88·6	99·3	58·2
F.	339·3	350·0	308·9	267·8	226·7	185·6	144·5	103·4	114·1	73·0
N.	−354·0	−364·7	−323·6*	−282·5	−241·4	200·3*	159·2	118·1	128·8	87·7
	1523	**1541**	**1599**	**1657**	**1715**	**1772**	**1830**	**1888**	**1906**	**1964**
N.	186·4*	146·1*	105·0	63·9*	22·8*	347·9*	306·8	265·7	276·4*	235·3
F.	151·1	161·8	120·7	79·6	38·5	−362·6	−321·5	−280·4	−291·1	−250·0
N.	313·6	324·3	283·2	242·1	201·0	159·9	118·8	77·7*	88·4	47·3
F.	−328·4	−339·1	−298·0	−256·9	−215·8	174·7	133·6	92·5	103·2	62·1
	1524	**1542**	**1600**	**1658**	**1716**	**1773**	**1831**	**1889**	**1907**	**1965**
N.	125·5	136·2*	95·1*	54·0*	12·9*	337·0*	295·9	254·8	265·5	224·4*
F.	140·3	151·0	109·9	68·8	27·7	−351·8	−310·7	−269·6	−280·3	−239·2
F.	287·8	298·5	257·4	216·3	175·2	134·1	93·0	51·9	62·6	21·5
N.	−302·6	−313·3	−272·2*	−231·1	190·0*	148·9*	107·8*	66·7*	77·4	36·3*
F.	99·9	110·6	69·5	28·4	−352·5	311·4	270·3	229·2	239·9	198·8
	1525	**1543**	**1601**	**1659**	**1717**	**1774**	**1832**	**1890**	**1908**	**1966**
N.	114·6	125·3	84·2*	43·1*	2·0	−326·1	−285·0	−243·9*	−254·6	−213·5
F.	277·0	287·7	246·6	205·5	164·4	123·3	82·2	41·1	51·8	10·7
N.	−291·8*	−302·5*	−261·4	−220·3	179·2	138·1*	97·0*	55·9	66·6*	25·5
					(America)	**1775**	**1833**	**1891**	**1909**	
N.	74·3	85·0	43·9	2·8	326·9	285·8*	244·7	203·6*	214·3	173·2
F.	89·1	99·8	58·7	17·6	341·7	300·6	259·5	218·4	229·1	188·0
N.	103·8	114·5	73·4	32·3	−356·4	−315·3	−274·2	−233·1	−243·8	203·7

TABLE IV-L—*cont.*

Cycles of recurrence of Eclipses—Solar and Lunar—*cont.*

(1)	Sun from node (2)	Successive differences (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
			Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.
		0	**57** 324·1	**115** 283·0	**173** 241·9	**191** 252·8	**249** 211·5	**307** 170·4	**365** 129·3	**423** 88·2	**481** 47·1
	Cyclic variation, add algebraically to fig. in col 2		−·08	−·17	−·25	+·22	+·14	+·05	−·03	−·12	−·20
			Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +10·7	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1
		A.D. 7	**65**	**123**	**181**	**199**	**256**	**314**	**372**	**430**	**488**
N.	12°·45	140·5	99·4	58·3	17·2	27·9	−352·0	310·9	269·8	228·7	187·6
F.	357°·11	155·2	114·2	73·1	32·0	42·7	1·6	325·7	284·6	243·5	202·4
N.	341°·78	169·9	128·9	87·8	46·7	57·4	16·3	−340·4	−299·3	−258·2	217·1
N.	188°·43	317·7	276·6*	235·5	194·4*	205·1	164·0	122·9	81·8*	40·7	364·8*
F.	173°·09	−332·4	−291·4	−250·3	−209·2	−219·9	178·8	137·7	96·7	55·6	14·5
		A.D. 8	**66**	**124**	**182**	**200**	**257**	**315**	**373**	**431**	**489**
N.	4°·40	129·6*	88·5	47·4	6·3	17·0*	341·1	300·0	258·9	217·8	176·7*
F.	349°·07	144·3	103·3	62·2	21·1	31·8	−355·9	−314·8	−273·7	−232·6	191·5
N.	180°·38	306·8*	265·7	224·6*	183·5	194·2	153·1	112·0*	70·9	29·8*	−353·9*
F.	165°·04	−321·5	−280·5	−239·4	198·3	209·0	167·9	126·8	85·7	44·6	3·5
		A.D. 9	**67**	**125**			**258**	**316**	**374**	**432**	**490**
F.	11°·69	103·9	62·8	21·7	345·8	−356·5	315·4	274·3	233·2	192·1	151·0
N.	356°·60	118·7	77·6	36·5*	360·6	6·1	−330·2	−289·1*	−248·0*	−206·9*	165·8
F.	187°·67	281·1	240·0	198·9	157·8	168·5	127·4	86·3	45·2	4·1	328·2
N.	172°·33	−295·9	−254·8	213·7	172·6	183·3*	142·2*	101·1	60·0	18·9	−343·0*
		A.D. 10	**68**		**183**	**201**	**259**	**317**	**375**	**433**	**491**
N	18°·98	78·3	37·2	−361·3	320·2	330·9	289·8	248·7	207·6*	166·5	125·4
F.	3°·65	93·0	52·0	10·9	335·0	345·7	304·6	263·5	222·4	181·3	140·2
N.	348°·31	107·8	66·7	25·6	−349·7	−360·4	−319·3	−278·2	−237·1	196·0*	154·9*
N.	194°·96	255·4	214·3	173·2	132·1	142·8	101·7	60·6	19·5	343·6	302·5
F.	179°·62	270·2	229·1	188·0	146·9	157·6	116·5	75·4	34·3	−358·4	317·3
N.	164°·29	−285·0	−243·8	202·7	161·6	172·3	131·2	90·1	49·0	7·9	−332·0
		A.D. 11	**69**	**126**	**184**	**202**	**260**	**318**	**376**	**434**	**492**
N.	10°·94	67·4	26·3	350·4	309·3	330·0	278·9	237·8	196·7	155·6	114·5
F.	355°·60	82·1	41·1	−365·2	324·1	334·8	293·7	252·6	211·5	170·4	129·3
N.	340°·26	96·9	55·8	14·7	−338·8	−349·5	−308·4	−267·3	−226·2	185·1	144·0
N.	186°·91	244·5	203·5	152·4*	121·3	132·0*	90·9*	49·8	8·7	332·8*	291·7*
F.	171°·58	−259·3	−218·3	177·2	136·1	146·8	105·7	64·6	23·5	−347·6	−306·5
		A.D. 12	**70**	**127**	**185**	**203**	**261**	**319**	**377**	**435**	**493**
N.	2°·89	56·5	15·4	339·5	298·4	309·1	268·0	226·9	185·8	144·7*	103·6
F.	347°·55	71·2	30·2	−354·3	−313·2	−323·9	−282·8	−241·7	200·6	159·5	118·4
F	194°·20	218·9	177·8	136·7	95·6	106·3	65·2	24·1	348·2	307·1	266·0
N.	178°·87	−233·7	192·6*	151·5	110·4*	121·1	80·0*	38·9*	−363·0	−321·9*	−280·8
		A.D. 13		**128**	**186**	**204**	**262**	**320**	**378**	**436**	**494**
F.	10°·18	30·8	−354·9	313·8	272·7	283·4	242·3	201·2	160·1	119·0	77·9
N	354°·84	45·6	4·5*	−328·6	−287·5	−298·2	−257·1*	−216·0*	174·9*	133·8	92·7*
F.	186°·16	208·0	166·9	125·8	84·7	95·4	54·3	13·2	337·3	296·2	255·1
N	170°·82	−222·8	181·7	140·6	99·5	110·2*	69·1	28·0	−352·1	−311·0	−269·9

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.
	539 6·0	**557** 16·7	**614** 340·8	**672** 299·7	**730** 258·6	**788** 217·5	**846** 176·4	**864** 187·1	**922** 146·0	**980** 104·9
	−·29	+·18	+·10	+·01	−·07	−·16	−·24	+·23	+·15	+·06
	Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +10·7	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +10·7	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1
	546	**564**	**622**	**680**	**738**	**795**	**853**	**871**	**929**	**987**
N.	146·5	157·2	116·1	75·0	33·9	−358·0	316·9*	327·6	286·5	245·4
F	161·3	172·0	130·9	89·8	48·7	7·6	331·7	342·4	301·3	260·2
N.	176·0	186·7	145·6	104·5	63·4	22·3	−346·4	−357·1	−316·0	−274·9
N	323·7*	334·4	293·3	252·2*	211·1	170·0*	128·9	159·6	98·5*	57·4*
F.	−338·5	−349·2	−308·1	−267·0	−225·9	184·8	143·7	154·4	113·3	72·2
	547	**565**	**623**	**681**	**739**	**796**	**854**	**872**	**930**	**988**
N.	135·6	146·3	105·2	64·1*	23·0	347·1	306·0	316·7*	275·6	231·5*
F	150·4	161·1	120·0	78·9	37·8	−361·9	−320·8	−331·5	−290·4	−249·3
N	312·8	323·5*	282·4*	241·3*	200·2	159·1	118·0	128·7*	87·6	46·5*
F.	−327·6	338·3	−297·2	−256·1	215·0	173·9	132·8	143·5	102·4	61·3
	548	**566**	**624**	**682**		**797**	**855**	**873**	**931**	**989**
F.	109·9	120·6	79·5	38·4	−362·5	321·4	280·3	291·0	249·9	208·8
N	124·7*	135·4*	94·3	53·2*	12·1*	−336·2	−295·1	−305·8	−264·7*	−223·6*
F	287·1	297·8	256·7	215·6	174·5	133·4	92·3	103·0	61·9	20·8
N.	−301·9	−312·6	−271·5*	−230·4*	189·3	148·2	107·1*	117·8*	76·7	35·6
	549	**567**	**625**	**683**	**740**	**798**	**856**	**874**	**932**	**990**
N.	84·3	95·0	53·9	12·8	336·9	295·8	254·7	265·4	224·3	183·2
F	99·1	109·8	68·7	27·6	−351·7	310·6	269·5	280·2	239·1	198·0
N.	113·8	124·5*	83·4	42·3	1·2	−325·3	−284·2*	−294·9	−253·8	212·7*
N	261·4*	272·1	231·0	189·9	148·8	107·7	66·6	77·3	36·2	−360·3*
F.	276·2	286·9	245·8	204·7	163·6	122·5	81·4	92·1	51·0	9·9
N	−290·9	−301·6	−260·5	−219·4	178·3	137·2	96·1	106·8	65·7	24·6
	550	**568**	**626**		**741**	**799**	**857**	**875**	**933**	**991**
N.	73·4	84·1*	43·0	1·9	326·0	284·9	243·8	254·5	213·4	172·3
F	88·2	98·9	57·8	16·7	340·8	299·7	258·6	269·8	228·2	187·1
N.	102·9	113·6	72·5	31·4	−355·5	−314·4	−273·3	−284·0	−242·9	201·8
N.	250·6*	261·3	220·4*	179·1	138·0*	96·9*	55·8	66·5*	25·4	349·5*
F.	−265·4	−276·1	−235·0	193·9	152·8	111·7	70·6	81·3	40·2	−364·3
	551	**569**	**627**	**684**	**742**	**800**	**858**	**876**	**934**	**992**
N.	62·5*	73·2	32·1*	−356·2	315·1	274·0	232·9	243·6	202·5	161·4
F.	77·3	88·0	46·9	5·8	−329·9	−288·8	−247·7	−258·4	217·3	176·2
F.	224·9	235·6	194·5	153·4	112·3	71·2	30·1	40·8	−364·9	323·8
N.	−239·7	−250·4*	−209·3*	168·2	127·1	86·0*	44·9*	55·6	14·5	−338·6*
	552	**570**	**628**	**685**	**743**	**801**	**859**	**877**	**935**	**993**
F.	36·8	47·5	6·4	330·5	289·4	248·3	207·2	217·9	176·8	135·7
N	51·6	62·3	21·2*	−345·3*	−334·2	−263·1	−222·0	−232·7*	191·6*	150·5*
F.	214·0	224·7	183·6	142·5	101·4	60·3	19·2	29·9	−354·0	312·9
N	−228·8	−239·5	198·4*	157·3	116·2	75·1*	34·0	44·7*	3·6	−327·7

TABLE IV-L—cont.

Cycles of recurrence of Eclipses—Solar and Lunar—cont.

			Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.
		0	1038 33·8	1096 22·7	1153 340·8	1211 305·7	1229 316·4	1287 275·3	1345 234·1	1403 193·1	1461 152·0
Cyclic variation; add algebraically to fig. in col. 2.			−·02	−·11	−·19	−·28	+·19	+·11	+·02	−·06	−·15
			Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.
Sun from node.		Successive differences.	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1
			(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
		A.D. 7	**1045**	**1103**	**1161**	**1219**	**1237**	**1295**	**1353**	**1410**	**1468**
N.	12°·45	140·5	204·3	163·2	122·1	81·0	91·7	50·6	9·5	333·6	292·5
F.	357°·11	155·2	219·1	178·0	136·9	95·8	166·5	65·4	24·3	348·4	307·3
N.	341°·78	169·9	−233·8	192·7	151·6	110·5	121·2	80·1	39·0	−363·1	−322·0
N.	188°·43	317·7	16·3*	340·4	299·3*	258·2	268·9*	227·8	186·6	145·5	104·4*
F.	173°·09	−332·4	31·1	−355·2	−314·1	−273·0	−288·7	−242·6	201·4	160·3	119·2
		A.D. 8	**1046**	**1104**	**1162**	**1220**	**1238**	**1296**		**1411**	**1469**
N.	4°·40	129·6*	193·4	152·3	111·2*	70·1*	90·8	39·7	363·8*	322·7*	281·6
F.	349°·07	144·3	−208·2	167·1	126·0	84·9	95·6	54·5	13·4	−337·5	−296·4
N.	180°·38	306·8*	5·4*	329·5	288·4	247·3	258·0*	216·9*	175·8*	134·7	93·6*
F.	165°·04	−321·5	20·2	−344·3	−303·2	−262·1	−272·8	−231·7	190·6	149·5	108·4
		A.D. 9	**1047**	**1105**	**1163**	**1221**	**1239**	**1297**	**1354**	**1412**	**1470**
F.	11°·69	103·9	167·7	126·6	85·5	44·4	55·1	14·0	338·1	297·0	255·9
N.	356°·60	118·7	182·5*	141·4	100·3*	59·2*	69·9*	28·8*	−352·9	−311·8*	−270·7
F.	187°·67	281·1	344·9	303·8	262·7	221·6	232·3	191·2	150·1	109·0	67·9
N.	172°·38	−295·9	−359·7*	−318·6	−277·5	−236·4	−247·1*	206·0	164·9*	123·8	82·7
		A.D. 10	**1048**	**1106**	**1164**	**1222**	**1240**		**1355**	**1413**	**1471**
N.	18°·98	78·3	143·1	101·0	59·9	18·8	39·5	−353·6	312·5	271·4	230·3
F.	3°·65	93·0	156·9	115·8	74·7	33·6	44·3	3·2	327·3	286·2	245·1
N.	348°·31	107·8	171·6	130·5*	89·4*	48·3	59·0*	17·9	−342·0	−300·9	−259·8
N.	194°·96	255·4	319·2*	278·1*	237·0*	195·9	206·6	165·5	124·4	83·3	42·2
F.	179°·62	270·2	334·0	292·9	251·8	210·7	221·4	180·3	139·2	98·1	57·0
N.	164°·29	−255·0	−348·7	−307·6	−266·5	−225·4	−236·1	195·0	153·9	112·8	71·7
		A.D. 11	**1049**	**1107**	**1165**	**1223**	**1241**	**1298**	**1356**	**1414**	**1472**
N.	10°·94	67·4	131·2	90·1	49·0	7·9	18·6	342·7	301·6	260·5	219·4
F.	355°·60	82·1	146·0	104·9	63·8	22·7	33·4	−357·5	316·4	275·3	234·2
N.	340°·26	96·9	160·7	119·6	78·5	37·4	48·1	7·0	−331·1	−290·0	−248·9
N.	186°·91	244·5	308·4	267·3*	226·2	185·1*	195·8*	154·7*	113·6	72·5*	31·4*
F.	171°·58	−259·3	−323·2	−282·1	−241·0	199·9	−210·6	169·5	128·4	87·3	46·2
		A.D. 12	**1050**	**1108**	**1166**		**1242**	**1299**	**1357**	**1415**	**1473**
N.	2°·89	56·5	120·3	79·2*	38·1*	−362·2	7·7	331·8*	290·7*	249·6	208·5
F.	347°·55	71·2	135·1	94·0	52·9	11·8	22·5	−346·6	−305·5	−264·4	−223·3
F.	194°·20	218·9	282·7	241·6	200·5	159·4	170·1	129·0	87·9	46·8	5·7
N.	178°·87	−233·7	−297·5*	−256·4	−215·3	174·2	184·9*	143·8*	102·7*	61·6*	20·5*
		A.D. 13	**1051**	**1109**	**1167**	**1224**		**1300**	**1358**	**1416**	**1474**
F.	10°·18	30·8	94·6	53·5	12·4	336·5	347·2	306·1	265·0	223·9	182·8
N.	354°·84	45·6	109·4	68·3*	27·2*	−351·3	−362·0*	−320·9	−279·8*	−238·7	197·6*
F.	186°·16	208·0	271·8	230·7	189·6	148·5	159·2	118·1	77·0	35·9	−360·0
N.	170°·82	−222·8	286·6	−245·5*	204·4	163·3	174·0	182·9*	91·8*	50·7	9·6

	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.
	1519 110·9	1537 121·6	1595 80·5	1653 39·4	1710 363·6	1768 322·4	1826 281·3	1884 240·2	1902 250·9	1960 209·8
	−·28	+·24	+·16	+·07	+·00	−·08	−·17	−·25	+·22	+·14
	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.
	+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1
	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
	1526	**1544**	**1602**	**1660**	**1718**	**1776**	**1834**	**1892**	**1910**	**1967**
N	251·4	262·1	221·0	179·9	138·8	97·7	56·6	15·5	26·2	350·3
F	266·2	276·9	235·8	194·7	153·6	112·5	71·4	30·3	41·0	−365·1
N	−250·9	−291·6	−250·5	209·4	168·3*	127·2	86·1	45·0	55·7	14·6
N	63·3*	74·0*	32·9*	357·1*	316·0*	274·9	233·8 (America)	192·7 (penumbra)	203·4	162·3*
F	78·1	88·8	47·7	6·6	−330·8	−289·7	−248·6	−207·5	−218·2	177·1
	1527	**1545**	**1603**	**1661**	**1719**	**1777**	**1835**	**1893**	**1911**	**1968**
N	240·5	251·2*	210·1	169·0	127·9	86·8*	45·7	4·6	15·3	339·4*
F	−255·3	−266·0	224·9	183·8	142·7	101·6	60·5	19·4	30·1	−354·2
N.	52·5*	63·2	22·1*	346·2*	305·1*	264·0	222·9*	181·8	192·5*	151·4
F.	67·3	78·0	36·9	−361·0	−319·9	−278·8	−237·7	196·6	207·3	166·2
	1528	**1546**	**1604**	**1662**	**1720**	**1778**	**1836**			**1969**
F.	214·8	225·5	184·4	143·3	102·2	61·1	20·0	344·1	−354·8	318·7
N.	−229·6*	−240·3*	199·2	158·1*	117·0*	75·9	34·8	−358·9*	4·4	−328·5
F	26·8	37·5	−361·1	320·5	279·4	238·8	197·2	156·1	166·8	125·7
N.	41·6	52·3*	11·2*	335·3	−294·2	−253·1	212·0*	170·9*	181·6	140·5
	1529	**1547**	**1605**	**1663**	**1721**	**1779**		**1894**	**1912**	**1970**
N.	189·2	199·9	158·8	117·7	76·6	35·5	−359·6	318·5	329·2	288·1
F.	204·0	214·7	173·6	132·5	91·4	50·3	9·2	338·3	344·0	302·9
N	−218·7*	−229·4	188·3	147·2	106·1*	65·0	23·9	−348·0	−358·7	−317·6
N	1·1*	11·8	335·9	294·8*	253·7	212·6	171·5	130·4*	141·1	100·0
F	15·9	26·6	−350·7	309·6	268·5	227·4	186·3	145·2	155·9	114·8
N.	30·6	41·3	0·2	−324·3	−283·2	−242·1	201·0	159·9	170·6	129·5
	1530	**1548**	**1606**	**1664**	**1722**	**1780**	**1837**	**1895**	**1913**	**1971**
N	178·3	189·0	147·9	106·8	65·7	24·6	348·7	307·6	318·8	277·2
F	193·1	203·8	162·7	121·6	80·5	39·4	−363·5	322·4	333·1	292·0
N	207·8	−218·5	177·4	136·3	95·2	54·1	13·0	−337·1	−347·8	306·7
N.	−355·5	0·9*	335·1*	294·0*	242·9	201·8	160·7	119·6*	130·3	89·2
F.	5·1	15·8	−339·9	−298·8	−257·7	−216·6	175·5	134·4	145·1	104·0
	1531	**1549**	**1607**	**1665**	**1723**	**1781**	**1838**	**1896**	**1914**	**1972**
N	167·4	178·1*	137·0	95·9	54·8*	13·7	337·8	296·7	307·4	266·3
F	182·2	192·9	151·8	110·7	69·6	28·5	−352·6	−311·5	−322·2	−281·1
F	329·9	340·5	299·4	258·3	217·2	176·1	135·0	93·9	104·6	63·5
N	−344·6	−355·3*	−314·2*	−273·1*	−232·0	190·0*	149·8	108·7	119·4	78·3
	1532	**1550**	**1608**	**1666**	**1724**		**1839**	**1897**	**1915**	**1973**
F.	141·7	152·4	111·3	70·2	29·1	−353·2	312·0	271·0	281·7	240·6
N.	156·5*	167·2	126·1	85·0*	43·9	2·8	−326·9*	−285·8*	−296·5	−255·4
F.	318·9	329·6	288·5	247·4	206·3	165·2	124·1	83·0	93·7	52·6
N.	−333·7	−344·4	−303·3	−262·2	−221·1	180·0*	138·9*	97·8	108·5	67·4

TABLE IV-L—*cont.*

Cycles of recurrence of Eclipses—Solar and Lunar—*cont.*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		0	57 Yrs. 324·1 Dys.	115 Yrs. 288·0 Dys.	173 Yrs. 241·9 Dys.	191 Yrs. 252·8 Dys.	249 Yrs. 211·5 Dys.	307 Yrs. 170·4 Dys.	365 Yrs. 129·3 Dys.	423 Yrs. 88·2 Dys.	481 Yrs. 47·1 Dys.
Cyclic variation, add algebraically to fig. in col. 2.			− ·08	− ·17	− ·25	+ ·22	+ ·14	+ ·05	− ·03	− ·12	− ·20
	Sun from node	Successive differences	+58 Yrs. −41·1 Dys.	+58 Yrs. −41·1 Dys.	+58 Yrs. −41·1 Dys.	+18 Yrs. +10·7 Dys.	+58 Yrs. −41·1 Dys.	+58 Yrs. −41·1 Dys.	+58 Yrs. −41·1 Dys.	+58 Yrs. −41·1 Dys.	+58 Yrs. −41·1 Dys.
		A.D. 14	**71**	**129**	**187**	**205**	**263**	**321**	**379**	**437**	**495**
N	17°·47	5·2	329·2	288·1	247·0	257·7	316·6	175·5	134·4	93·3	52·2
F	2°·13	19·9	344·0	302·9	261·8	272·5	231·4	190·3	149·2	108·1	67·0
N	346°·79	34·7	—358·7	—317·6	—276·5	—287·2	—246·1	205·1	164·0•	122·9	81·8
N	193°·44	182·3	**72** 141·3	**130** 100·2	**188** 59·1	**206** 69·8	**264** 28·7	—352·8	311·7	270·6	229·5
F	178°·11	197·1	156·1	115·0	73·9	84·6	43·5	2·4	326·5	285·4	244·3
N.	162°·77	211·9	170·8	129·7	93·6	99·3	58·2	17·1	—341·2	—300·1	—359·0
N	9°·42	—359·5	318·3	277·2	236·1	246·8	205·7	164·6	123·5	82·4	41·3
F	354°·09	9·0	—333·1	—292·0	—250·9	—261·6	—220·5	179·4	138·3	97·2	56·1
		A.D. 15	**73**	**131**	**189**	**207**	**265**	**322**	**380**	**438**	**496**
N	185°·39	171·5	130·3•	89·2	48·1•	58·8•	17·7	341·8	300·7•	259·6•	218·5•
F	170°·06	186·2	145·1	104·0	62·9	73·6	32·5	—356·6	—315·5	—274·4	—233·3
N	1°·38	348·6	307·5•	266·4	225·3•	236·0	194·9	153·8	112·7•	71·6	30·5
F	346°·04	—363·4	—322·3	—281·2	—240·1	—250·8	—209·7	168·6	127·5	86·4	45·3
		A.D. 16	**74**	**132**	**190**	**208**		**323**	**381**	**439**	**497**
F	192°·69	145·8	104·7	63·6	22·5	33·2	—357·4	316·3	275·2	234·1	193·0
N	177°·35	160·6•	119·5	78·4•	37·3•	48·0	6·9•	—331·2•	—290·1•	—249·0	—207·8
F	8°·66	323·0	281·9	240·8	199·7	210·4	169·3	128·2	87·1	46·0	4·9
N	353°·83	—337·7•	—296·6	—255·5	—214·4	—225·1•	184·0•	142·9	101·8	60·7•	19·[illegible]
		A.D. 17	**75**	**133**	**190**	**209**	**266**	**324**	**382**	**440**	**498**
N	199°·98	180·1	79·0	37·9	—362·1	7·5	331·6	290·5	249·4	208·3	167·2
F.	184°·64	134·9	93·8	52·7	11·6	22·3	346·4	305·3	264·2	223·1	182·0
N	169°·31	149·7	108·5	67·4	26·3	37·0	—361·1	—320·0	—278·9	—237·8	196·7
N.	15°·95	297·3	256·2	215·1	174·0	184·7	143·6	102·5	61·4	20·3	344·5
F.	0°·62	312·1	271·0	229·9	188·8	199·5	158·4	117·3	76·2	35·1	—359·3
N	345°·28	—326·8	—285·7	—244·6	—203·5	214·2	173·1	132·0	90·9	49·8	8·7
		A.D. 18	**76**	**134**	**191**		**267**	**325**	**383**	**441**	**499**
N.	191°·93	109·2	68·1	27·0	—351·2	—361·9	320·8	279·7•	238·6•	197·5	156·4
F.	176°·59	124·0	82·9	41·8	0·7	11·4	335·6	294·5	253·4	212·3	171·2
N.	161°·26	138·8	97·7	56·6	15·5	26·2	—350·3	—309·2	—268·1	—227·0	185·9
N	7°·91	286·4	245·3	204·2	163·1	173·8	132·7	19·6	50·5	9·4	333·5•
F.	352°·57	—301·2	—260·1	—219·0	177·9	188·6	147·5	106·4	65·3	24·2	—348·3
		A.D. 19	**77**	**135**	**192**	**210**	**268**	**326**	**384**	**442**	**500**
N.	188°·88	98·4•	57·3	16·2•	340·3•	—351·0	309·9	268·8•	227·7	186·6•	145·5
F.	168°·55	118·1	72·0	30·9	—355·1	0·5	—324·6	—283·5	— 242·4	201·3	160·2
F.	15°·2	260·8	219·7	178·6	137·5	148·2	107·1	66·0	24·9	349·0	307·9
N.	359°·9	—275·6•	—234·5	193·4•	152·3	163·0	121·9	80·6•	39·7•	—363·8	—322·7

(1)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	539 Yrs. 6·0 Dys.	557 Yrs. 16·7 Dys.	614 Yrs. 340·8 Dys.	672 Yrs. 299·7 Dys.	730 Yrs. 258·6 Dys.	788 Yrs. 217·5 Dys.	846 Yrs. 176·4 Dys.	864 Yrs. 187·1 Dys.	922 Yrs. 146·0 Dys.	980 Yrs. 104·9 Dys.
	− ·29	+ ·18	+ ·10	+ ·01	− ·07	− ·16	− ·24	+ ·23	+ ·15	+ ·06
	+58 Yrs. −41·1 Dys.	+18 Yrs. +10·7 Dys.	+58 Yrs. −41·1 Dys.	+58 Yrs. −41·1 Dys.	+58 Yrs. −41·1 Dys.	+58 Yrs. −41·1 Dys.	+58 Yrs. −41·1 Dys.	+18 Yrs. +10·7 Dys.	+58 Yrs. −41·1 Dys.	+58 Yrs. −41·1 Dys.
	553	**571**		**686**	**744**	**802**	**860**	**878**	**936**	**994**
N	11·1	21·8	345·9	304·8	263·7	222·6	181·5	192·2	151·1	120·0
F	25·9	36·6	—360·7	319·6	278·5	237·4	196·3	207·0	165·9	124·8
N	40·7	51·4	10·3	—334·4	—293·3	—252·2•	211·1•	—221·8	180·7•	139·6
N	188·4	199·1	**629** 158·0	**687** 116·9	**745** 75·8	**803** 34·7•	—358·8•	4·3	328·4•	287·3•
F	203·2	213·9	172·8	131·7	90·6	49·5	8·4	19·1	343·2	302·1
N	—217·9	—228·6	187·5	146·4	105·3	64·2	23·1	33·8	—357·9	—316·8
N	0·2•	10·9	335·0	293·9	252·8	211·7	170·6	181·3	140·2	99·1
F	15·0	25·7	—349·8	—308·7	—267·6	—226·5	185·4	196·1	155·0	113·4
	554	**572**	**630**	**688**	**746**	**804**	**861**	**879**	**937**	**995**
N.	177·4	188·1•	147·0•	105·9•	64·8•	23·7	347·8•	—358·5	317·4•	276·3
F	192·2	- 202·9	161·8	120·7	79·6	38·5	—362·6	8·1	—332·2	—291·1
N	—354·6•	0·0•	324·2•	283·1	242·0	200·9	159·8•	170·5•	129·4	88·3
F	4·2	14·9	—339·0	—297·9	—256·8	215·7	174·6	185·3	144·2	103·1
	555	**573**	**631**	**689**	**747**		**862**	**880**	**938**	**996**
F.	151·8	162·5	121·4	80·3	39·2	—363·4	322·3	333·0	291·9	250·8
N	166·6	177·[illegible]•	136·2	95·1	54·0•	12·9	—337·1	—347·8	—306·7•	—265·6•
F.	329·1	339·8	298·7	257·6	216·5	175·4	134·3	145·0	108·9	62·8
N	—343·8	—354·[illegible]•	—313·4•	—272·3	—231·2•	190·1	149·0•	159·7	118·6•	77·5
	556	**574**	**632**	**690**	**748**	**805**	**863**	**881**	**939**	**997**
N.	126·1	136·8	95·7	54·6	13·5	337·6	296·5	307·2	266·1	225·0
F.	140·9	151·6	110·5	69·4	28·3	—352·4	311·3	322·0	280·9	239·8
N.	155·6	166·3•	125·2	84·1	43·0	1·9	—326·0	—336·7	—295·6	—254·5
N.	303·4	314·1	273·0	231·9	190·8	149·7	108·6	119·3	78·2	37·1
F.	318·2	328·9	287·8	246·7	205·6	164·5	123·4	134·1	93·0	51·9
N.	—332·8	—343·6	—302·5	—261·4	—220·3	179·2•	138·1•	148·7	107·6•	66·5
	557	**575**	**633**	**691**	**749**	**806**	**864**	**882**	**940**	**998**
N.	115·3	126·0	84·9•	43·8	2·7•	326·8•	285·7	296·4	255·3	214·2•
F.	130·1	140·8	99·7	58·6	17·5	341·6	300·5	311·2	270·1	229·0
N	144·8	155·5	114·4	73·3	32·2	—356·3	—315·2	—325·9	—284·8	—243·7
N.	292·4	303·1	262·0	220·9	179·8	138·7	97·6	108·3•	67·2	26·1
F.	—307·2	—317·9	—276·8	—235·7	194·6	153·5	112·4	123·1	82·0	40·9
	558	**576**	**634**	**692**		**807**	**865**	**883**	**941**	**999**
N.	104·4	115·1•	74·0	82·8•	—357·1	316·0•	274·9	285·6•	244·5	208·4•
F.	119·1	129·8	88·7	47·6	6·5	—330·7	—289·6	—300·3	—259·2	—218·1
F.	266·8	277·5	236·4	195·3	154·2	113·1	72·0	82·7	41·6	0·5
N.	—281·6	—292·3•	—251·2•	—210·1	169·0	127·8•	86·8•	97·5	56·4•	15·3•

TABLE IV-L—*cont.*

Cycles of recurrence of Eclipses—Solar and Lunar—*cont.*

	Sun from node.		(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	
		Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	
		0	1038 63·8	1096 22·7	1153 346·8	1211 305·7	1229 316·4	1287 275·3	1345 234·1	1403 193·1	1461 152·0	
		Cyclic variation, add algebraically to fig. in col. 2.	−·02	−·11	−·19	−·28	+·19	+·11	+·02	−·06	−·15	
		Successive differences.	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	
		A.D. 14	**1052**	**1110**		**1225**	**1243**	**1301**	**1359**	**1417**	**1475**	
N.	17°·47	5·2	68·9	27·8	—351·9	310·8	321·5	280·4	239·3	198·2	157·1	N
F.	2°·13	19·9	83·7	42·6	1·5	325·6	336·3	295·2	254·1	213·0	171·9	F
N.	346°·79	34·7	98·5	57·4	16·3	—340·4*	—351·1	—310·0	—268·9	—227·8	186·7*	N.
					1168	**1226**	**1244**	**1302**	**1360**			
N.	193°·44	182·3	246·2*	205·1*	164·0*	122·9	133·6	92·5*	51·4	10·3	334·4*	N
F.	178°·11	197·1	261·0	219·9	178·8	137·7	148·4	107·3	66·2	25·1	349·2	F
N.	162°·77	311·9	—275·7	234·6	193·5	152·4	163·1	122·0	80·9	39·8	—363·9	N
N	9°·42	—359·5	58·0	16·9	341·0	299·9*	310·6	269·5	228·4	187·3	146·2	N.
F	354°·09	9·0	72·8	31·7	—355·8	—314·7	—325·4	—284·3	—243·2	202·1	161·0	F.
		A.D. 15	**1053**	**1111**	**1169**	**1227**	**1245**	**1303**	**1361**	**1418**	**1476**	
N.	185°·39	171·5	235·2*	194·1	153·0*	111·9*	122·6*	81·5*	40·4*	—364·5*	323·[illegible]	N
F	170°·06	186·2	—250·0	—208·9	167·8	126·7	137·4	96·3	55·2	14·1	—338·2	F.
N	1°·38	348·6	47·2*	6·1	330·2	289·1	299·8*	258·7*	217·6	176·5	135·4	N
F	346°·04	363·4	62·0	20·9	—345·0	—303·9	—314·6	—273·5	—232·4	191·3	150·2	F
		A.D. 16	**1054**	**1112**	**1170**	**1228**	**1246**	**1304**	**1362**	**1419**	**1477**	
F.	192°·69	145·8	209·7	165·6	127·5	86·3	97·0	55·9	14·7	338·8	297·7	F
N.	177°·35	160·6*	—224·5*	183·4	142·3	101·1*	111·8	70·7*	29·6*	—353·7	—312·6	N
F.	8°·66	323·0	21·7	345·9	304·8	263·7	274·4	233·3	192·2	151·1	110·0	F
N.	353°·33	—337·7*	36·4	—360·6*	—319·5	—278·4*	—289·1	—248·0	206·9	165·8*	124·7*	N.
		A.D. 17	**1055**	**1113**	**1171**	**1229**	**1247**	**1305**	**1362**	**1420**	**1478**	
N.	199°·98	120·1	183·9	142·8	101·7	60·6	71·3	30·2	—354·4	313·3	272·2	N.
F.	184°·64	134·9	198·7	157·6	116·5	75·4	86·1	45·0	3·9	328·1	287·0	F
N.	169°·31	149·7	213·4*	172·3	131·2	90·1	100·8*	59·7	18·6	—342·8	—301·7	N.
N.	16°·95	297·3	—361·3	320·2	279·1	238·0	248·7	207·6	166·5	125·4	84·3	N.
F.	0°·62	312·1	10·8	334·9	293·8	252·7	263·4	222·3	181·2	140·1	99·0	F
N.	345°·28	—326·8	25·4	—349·6	—308·5*	—267·4	278·1	—237·0	195·9	154·8*	113·7	N
		A.D. 18	**1056**	**1114**	**1172**	**1230**	**1248**	**1306**	**1363**	**1421**	**1479**	
N.	191°·93	109·2	173·1*	132·0	90·9	49·8*	60·5*	19·4	343·5*	302·4*	261·3*	N
F.	176°·59	124·0	187·9	146·8	105·7	64·6	75·3	34·2	—358·3	317·2	276·1	F
N.	161°·26	138·8	202·6	161·5	120·4	79·3	90·0	48·9	7·8	—331·9	—290·8	N.
N.	7°·91	286·4	—351·0	309·1	268·0	226·9	237·6	196·5	155·4	114·3	73·2*	N
F.	352°·57	—301·2	0·5	—324·9	—282·8	—241·7	—252·4	—211·3	170·2	129·1	88·0	F.
		A.D. 19	**1057**	**1115**	**1173**	**1231**	**1249**	**1307**	**1364**	**1422**	**1480**	
N.	183°·88	98·4*	163·3	121·2*	80·1*	39·0	49·7*	8·6*	332·7*	291·6	250·5	N
F.	168°·55	113·1	177·0	135·9	94·8	53·7	64·4	23·3	—347·4	—306·3	—265·2	F.
F.	15°·2	260·8	324·7	283·6	242·5	201·4	212·1	171·0	129·9	88·8	47·7	F.
N.	359°·9	—275·6*	—339·5	—298·4	—257	—216·2	—226·9	185·8	144·7	103·6*	62·5	N.

Sun from node.	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.
	1519 110·9	1587 121·6	1595 80·5	1653 39·4	1710 363·6	1768 322·4	1826 281·3	1884 240·2	1902 250·9	1960 209·8
Cyclic variation	−·23	+·24	+·16	+·07	+·00	−·08	−·17	−·25	+·22	+·14
Successive differences	+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1
	1533	**1551**	**1609**	**1667**	**1725**	**1782**	**1840**	**1898**	**1916**	**1974**
17°·47	116·0	126·7	85·6	44·5	3·4	327·5	286·4	245·3	256·0	214·9
2°·13	130·8	141·5	100·4	59·3	18·2	342·3	301·2	260·1	270·8	229·7
346°·79	145·6*	156·3*	115·2	74·1*	33·0	—357·1	—316·0	—274·9	—285·6	—244·5
						1783	**1841**	**1899**	**1917**	**1975**
193°·44	293·3	304·0	262·9*	221·8	180·7	139·6	98·5	57·4	68·1	27·0
178°·11	308·1	318·8	277·7	236·6	195·5	154·4	113·3	72·2	82·9	41·8
162°·77	—322·8	—333·5	—292·4	—251·3	210·2	169·1	128·0	86·9	97·6	56·5
9°·42	105·1	115·8	74·7*	33·6	—357·7	316·6	275·5	234·4	245·1	204·0
354°·09	119·9	130·6	89·5	48·4	7·3	—331·4	—290·3	—249·2	—259·9	—218·8
	1534	**1552**	**1610**	**1668**	**1726**	**1784**	**1842**	**1900**	**1918**	**1976**
185°·39	282·3	293·0*	251·9*	210·8	169·7	128·6*	87·5*	46·4	57·1	16·0*
170°·06	—297·1	—307·8	—266·7	—225·6	184·5	143·4	102·3	61·2	71·9	30·8
1°·38	94·3*	105·0	63·9	22·8*	346·9	305·8*	264·7	223·6*	234·3	193·2*
346°·04	109·1	119·8	78·7	37·6	—361·7	—320·6	—279·5	—238·4	—249·1	208·0
	1535	**1553**	**1611**	**1669**	**1727**	**1785**	**1843**	**1901**	**1919**	
192°·69	256·6	267·3	226·2	185·1	144·0	102·9	61·8	20·7	31·4	—355·5
177°·35	—271·5	—282·2	—241·1*	200·0	158·9*	117·8*	76·7	35·6*	46·3	5·2
8°·66	68·9	79·6	38·5	—362·7	321·6	280·5	239·4	198·3	209·0	167·9*
353°·33	83·6*	94·3	53·2*	12·1	—336·3	—295·2*	—254·1*	213·0*	—223·7	182·6
	1536	**1554**	**1612**	**1670**	**1728**	**1786**	**1844**	**1901**	**1920**	**1977**
199°·98	231·1	241·8	200·7	159·6	118·5	77·4	36·3	—360·4	5·9	339·0
184°·64	245·9	256·6	215·5	174·4	133·3	92·2	51·1	10·0	20·7	344·8
169°·31	—260·6	—271·3	—230·2	189·1	148·0*	106·9	65·8	24·7	35·4	—359·5
16°·95	43·2	53·9	12·8	336·9	295·8	254·7	213·6	172·5	183·2	142·1
0°·62	57·9	68·6	27·5	—351·7	310·6	269·5	228·4	187·3	198·0	156·9
345°·28	72·6	83·3*	42·2	1·1	—325·3	—284·2	—243·1	202·0*	212·7	171·6
	·1537	**1555**	**1613**	**1671**	**1729**	**1787**	**1845**	**1902**		**1978**
191°·93	220·2	230·9*	189·8	148·7*	107·6	66·5	25·4*	349·5*	—360·2	319·1
176°·59	235·0	245·7	204·6	163·5	122·4	81·3	40·2	—364·3	9·7	333·8
161°·26	—249·7	—260·4	—219·3	178·2	137·1	96·0	54·9	13·8	24·5	—348·6
7°·91	32·1	42·8*	1·7	325·5	284·8	243·7	202·6	161·5	172·2	131·1
352°·57	46·9	57·6	16·5	—340·3	—299·6	—258·5	—217·4	176·3	187·0	145·9
	1538	**1556**	**1614**	**1672**	**1730**	**1788**	**1846**	**1903**	**1921**	**1979**
183°·88	209·4	220·1*	179·0*	137·9	96·8*	55·7*	14·6	338·7*	349·4	308·3*
168°·55	—224·1	—234·8	193·7	152·6	111·5	70·4	29·3	—353·4	—364·1	—323·0
15°·2	6·6	17·3	341·4	300·3	259·2	218·1	177·0	135·9	146·6	105·5
359°·9	21·4	32·1	—356·2*	—315·1	—274·0*	—232·9	191·8*	150·7	161·4*	120·3

TABLE IV-L—*cont*

Cycles of recurrence of Eclipses—Solar and Lunar—*cont.*

		0	Yrs Dys. 57 324·1	Yrs Dys 115 283·0	Yrs. Dys. 173 241·9	Yrs. Dys 191 252·6	Yrs Dys. 249 211·5	Yrs Dys. 307 170·4	Yrs Dys 365 126·3	Yrs. Dys. 423 68·2	Yrs. Dys. 481 47·1		Yrs Dys. 539 6·0	Yrs Dys. 557 10·7	Yrs Dys 614 340·8	Yrs. Dys. 672 298·7	Yrs Dys. 730 256·6	Yrs. Dys. 788 217·5	Yrs. Dys. 846 176·4	Yrs Dys 864 187·1	Yrs. Dys 922 146·0	Yrs. Dys. 980 104·9
		Cyclic variation, add algebraically to fig in col 2	−·08	−·17	−·25	+·22	+·14	+·05	−·03	−·12	−·20		−·29	+·18	+·10	+·01	−·07	−·16	−·24	+·23	+·15	+·06
	Sun from node	Successive differences.	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs Dys +58 −41·1	Yrs Dys +18 +10·7	Yrs Dys. +58 −41·1	Yrs Dys. +58 −41·1	Yrs Dys +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1		Yrs Dys. +58 −41·1	Yrs Dys. +18 +10·7	Yrs Dys +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs Dys. +18 +10·7	Yrs. Dys +58 −41·1	Yrs. Dys. +58 −41·1
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
		A.D. 20	**78**		**193**	**211**	**269**	**327**	**385**	**443**	**501**		**559**	**577**	**635**	**693**	**750**	**808**	**866**	**884**	**942**	**1000**
F.	191°·17	72·7	31·6	−355·7	314·6	325·3	284·2	243·1	202·0	160·9	119·8	F	78·9	89·4	48·3	7·2	331·4	290·3	249·2	259·9	218·8	177·7
N.	175°·84	87·5	46·3*	5·2*	−329·4	−340·1	−299·0*	−257·9	−216·8	175·7	134·6*	N	93·5*	104·2	63·1	22·0*	−346·2	−305·1	−264·0*	−274·7*	−233·6*	192·5*
F	7°·15	249·9	208·8	167·7	126·6	137·3	96·2	55·1	14·0	338·2	297·1	F	256·0	266·7	225·6	184·5	143·4	102·3	61·2	71·9	30·8	−354·9
N.	351°·82	−264·6*	−223·5	182·4	141·3	152·0*	110·9	69·8	28·7	−352·9	−311·8	N	−270·7	−281·4*	240·3	199·2*	158·1	117·0*	75·9*	86·6*	45·5*	4·4
		A.D. 21	**79**	**136**	**194**	**212**	**270**	**328**	**386**	**444**	**502**		**560**	**578**	**636**		**751**	**809**	**867**	**885**	**943**	**1001**
N.	198°·46	47·0	5·9	330·1	259·0	249·7	258·6	217·5	176·4	135·3	94·2	N.	53·1	63·8	22·7	346·8	305·7	264·6	223·5	234·2	193·1	152·0
F.	183°·13	61·8	20·7	344·9	303·8	314·5	273·4	232·3	191·2	150·1	109·0	F	67·9	78·6	37·5	−361·6	320·5	279·4	238·3	249·0	207·9	166·8
N.	167°·79	76·6	35·4	−359·6	−318·5	−329·2	−288·1	−247·0	205·9	164·8	123·7*	N	82·6	93·3	52·3	11·1	−335·2	−294·1	−253·0	−263·7	−222·6	181·5*
N.	14°·41	224·2	183·1	142·0	100·9	111·6	70·5	29·4	−353·6*	312·5	271·4	N.	230·3	241·0	199·9	158·8	117·7	76·6	35·5	46·2	5·1	329·2
F.	359°·10	239·0	197·9	156·8	115·7	126·4	85·8	44·2	3·1	327·3	286·2	F	245·1	255·8	214·7	173·6	132·5	91·4	50·3	61·0	19·9	344·0
N.	343°·77	−253·7	212·6	171·5	130·4	141·1	100·0	58·9	17·8	−342·0	−300·9	N	−259·8*	−270·5	−229·4	188·3	147·2	106·1	65·0	75·7	34·6	−358·7
		A.D. 22		**137**	**195**	**213**	**271**	**329**	**387**	**445**	**503**		**561**	**579**	**637**	**694**	**752**	**810**	**868**	**886**	**944**	**1002**
N.	190°·42	36·1	−360·3	319·2	278·1	288·8	247·7	206·6*	165·5	124·4	83·3*	N	42·2*	52·9	11·8*	335·9*	294·8*	253·7*	212·6	223·3	182·2*	141·1*
F.	175°·08	50·9	9·8	−334·0	−292·9	−303·6	−262·5	−221·4	180·3	139·2	98·1	F	57·0	67·7	26·6	−350·7	−309·6	−268·5	−227·4	−238·1	197·0	155·9
N.	6°·39	213·3	172·2	131·1	90·0	100·7*	59·6	18·5	342·7	301·6*	260·5	N	219·4	230·1	189·0*	147·9	106·8	65·7	24·6	35·3	−359·4	318·3
F.	351°·06	−228·1	187·0	145·9	104·8	115·5	74·4	33·3	−357·5	−316·4	−275·3	F	−234·2	−244·9	−203·8	162·7	121·6	80·5	39·4	50·1	9·0	−333·1
		A.D. 23	**80**	**138**	**196**	**214**	**272**	**330**	**388**	**446**	**504**		**562**	**580**	**638**	**695**	**753**	**811**	**869**	**887**	**945**	**1003**
N.	182°·37	25·3	349·4	308·3*	267·2	277·9	236·8*	195·7	154·6*	113·5*	72·4	N	31·8*	42·0	0·9*	325·0	283·9*	242·8	201·7*	212·4	171·3	1130·2
						(America)																
F.	167°·03	40·0	−364·2	−323·1	−282·0	−292·7	−251·6	210·5	169·4	128·3	87·2	F	46·1	56·8	15·7	−339·8	−298·7	−257·6	216·5	227·2	186·1	145·0
F.	13°·68	187·7	146·6	105·5	64·4	75·1	34·0	−358·1	317·0	275·9	234·8	F	193·7	204·4	163·3	122·2	81·1	40·0	−364·1	9·6	333·7	292·6
N	358°·35	202·5	161·4*	120·3	79·2*	89·9	48·8*	7·7*	−331·8	−290·7	−249·6	N	−208·5*	−219·2*	178·1	137·0	95·9*	54·8*	13·7	24·4*	−348·5	−07·4
F.	189°·66	−364·9	323·7	282·6	241·5	252·2	211·1	117·0	128·9	87·8	46·7	F	5·6	16·3	340·5	299·4	258·3	217·2	176·1	186·8	145·7	4·6
		A.D. 24	**81**	**139**	**197**	**215**	**273**	**331**	**389**	**447**	**505**		**563**	**581**		**696**	**754**	**812**	**870**	**888**	**946**	**1004**
N.	174°·82	14·4*	−338·5*	−297·4	−256·3	−267·0	−225·9*	184·8	143·7	102·6*	61·5*	N	20·4	31·1	−355·3	−314·2*	−273·1	−232·0*	190·9	201·6*	160·5	119·4*
F.	5°·64	176·7	135·6	94·5	53·4	64·1	23·0	347·2	306·1	265·0	223·9	F	182·8	193·5	152·4	111·3	70·2	29·1	−353·2	−363·9	322·8	281·7
N.	350°·30	191·5	150·4	109·3*	68·2	78·9*	37·8*	−362·0*	−320·9	−279·8	−238·7	N	197·6*	208·3	167·2*	126·1	85·0	43·9*	2·8	18·5*	−337·6	−296·5*
N.	196°·95	339·2	298·1	257·0	215·9	226·6	185·5	144·4	103·3	62·2	21·1	N	345·2	−355·9	314·8	278·7	232·6	191·5	150·4	161·1	120·0	78·9
F.	173°·57	−354·0	312·9	271·8	230·7	241·4	200·3	159·2	118·1	77·0	35·9	F	−360·0	5·5	329·6	288·5	247·4	266·3	165·2	175·9	134·8	93·7
		A.D. 25	**82**	**140**	**198**	**216**	**274**	**332**	**390**	**448**	**506**		**564**	**582**	**639**	**697**	**755**	**813**	**871**	**889**	**947**	**1005**
N.	166°·28	3·5	−327·6	−286·5	−245·4	−256·1	215·0	173·9	132·8	91·7	50·6	N	9·5	20·2	−344·3	−303·2	−262·1	−221·0	179·9	190·6	149·5	108·4
N.	12°·93	151·1	110·0	68·9	27·8	38·5	−362·7	321·6*	280·5	239·4	198·3	N	157·2	167·9	126·8	85·7	44·6	3·5*	327·6	338·3	297·2	256·1
F.	357°·59	165·9	124·8	83·7	42·6	53·3	12·2	336·4	295·3	254·2	213·1	F	172·0	182·7	141·6	100·5	59·4	18·3	342·4	−353·1	312·0	270·9
			83	**141**	**199**	**217**									**640**	**698**	**756**					
N.	342°·25	180·6	139·5	98·4	57·3	68·0	26·9	−351·1	−310·0	−268·9	−227·8*	N	186·7	197·4	156·3	115·2	74·1	33·0	−357·1	2·6	−326·7	−285·6
N.	188°·90	328·3*	287·2	246·1*	205·0	215·7	174·6	133·5*	92·4	51·3*	10·2	N	334·3	345·0	303·9*	262·8*	221·7*	180·6	139·5	150·2*	109·1*	68·0
F.	173°·57	−343·1	−302·0	−260·9	−219·8	−230·5	189·4	148·3	107·2	66·1	25·0	F	−349·1	−359·8	−318·7	−277·6	−236·5	195·4	154·3	165·0	123·9	82·8
		A.D. 26	**84**	**142**	**200**	**218**	**275**	**333**	**391**	**449**	**507**		**565**	**583**	**641**	**699**	**757**	**814**	**872**	**890**	**948**	**1006**
N.	4°·88	140·2	99·1	58·0*	16·9*	27·6	−351·7*	310·6*	269·5	228·4	187·3	N	146·2	156·9*	115·8	74·7	33·6*	−357·8	316·7*	327·4	286·3	245·2
F.	349°·54	155·0	113·9	72·8	31·7	42·4	1·3	−325·4	−284·3	−243·2	202·1	F	161·0	171·7	130·6	89·5	48·4	7·3	−331·5	−342·2	−301·3	−260·0
N.	180°·86	317·4	276·3*	235·2*	194·1	204·8*	163·7	122·6*	81·5*	40·4	−364·5	N.	323·5*	334·2*	293·1	252·0*	210·9	169·8*	128·7*	139·4*	98·3*	57·2*
F.	165°·52	−332·2	−291·1	−250·0	208·9	−219·6	178·5	137·4	96·3	55·2	14·1	F	−338·3	−349·0	−307·9	−266·8	−225·7	184·6	143·5	154·2	113·1	72·0

Cycles of recurrence of Eclipses—Solar and Lunar—*cont.*

Sun from node.	Successive differences.	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)		(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
	0	Yrs. Dys. 1038 68.8	Yrs. Dys. 1096 22.7	Yrs. Dys. 1153 346.8	Yrs. Dys. 1211 305.7	Yrs. Dys. 1229 316.4	Yrs. Dys. 1287 275.8	Yrs. Dys. 1345 234.1	Yrs. Dys. 1403 193.1	Yrs. Dys. 1461 152.0		Yrs. Dys. 1519 110.9	Yrs. Dys. 1537 121.6	Yrs. Dys. 1595 80.5	Yrs. Dys. 1653 39.4	Yrs. Dys. 1710 363.6	Yrs. Dys. 1768 322.4	Yrs. Dys. 1826 281.8	Yrs. Dys. 1884 240.2	Yrs. Dys. 1902 250.9	Yrs. Dys. 1960 209.8
Cyclic variation, add algebraically to fig in col. 2		−·02	−·11	−·19	−·28	+ 19	+·11	+ 02	− 06	−·15		−·23	+ 24	+ 16	+ 07	+ 00	− 08	−·17	−·25	+·22	+·14
		Yrs. Dys. +58 −41.1	Yrs. Dys. +58 −41.1	Yrs. Dys. +58 −41.1	Yrs. Dys. +58 −41.1	Yrs. Dys. +18 +10.7	Yrs. Dys. +58 −41.1	Yrs. Dys. +58 −41.1	Yrs. Dys. +58 −41.1	Yrs. Dys. +58 −41.1		Yrs. Dys. +58 −41.1	Yrs. Dys. +18 +10.7	Yrs. Dys. +58 −41.1	Yrs. Dys. +58 −41.1	Yrs. Dys. +58 −41.1	Yrs. Dys. +58 −41.1	Yrs. Dys. +58 −41.1	Yrs. Dys. +58 −41.1	Yrs. Dys. +18 +10.7	Yrs. Dys. +58 −41.1
	A.D. 20	**1058**	**1116**	**1174**	**1232**	**1250**		**1365**	**1423**	**1481**		**1539**	**1557**	**1615**	**1673**	**1731**	**1789**		**1904**	**1922**	**1980**
F. 191°17	72.7	136.6	95.5	54.4	13.3	24.0	348.1	307.0	265.9	224.8	F.	183.7	194.4	153.3	112.3	71.1	30.0	−354.2	313.1	323.8	282.7
N. 175°84	87.5	151.4*	110.3	69.2*	28.1*	38.8*	−362.9	−321.8	−280.7*	−239.6*	N	198.5*	−209.2*	168.1	127.0*	85.9*	44.8	3.7*	−327.8	−338.5	−297.4
F. 7°15	249.9	313.8	272.7	231.6	190.5	201.2	160.1	119.0	77.9	36.8	F	−360.9	6.4	330.5	289.4	248.3	207.2	166.1	125.0	135.7	94.6
N. 351°82	−264.6*	−228.5*	−237.4	−246.3*	205.2	215.9	174.8	133.7*	92.6	51.5	N.	10.4*	21.1*	−345.2	−304.1	−263.0*	−221.9*	180.8*	139.7	150.4	109.3
	A.D. 21	**1059**	**1117**	**1175**			**1308**	**1366**	**1424**	**1482**		**1540**	**1558**	**1616**	**1674**	**1732**	**1790**	**1847**	**1905**	**1923**	**1981**
N. 198°46	47.0	110.9	69.8	28.7	−352.9	−363.6	322.5	281.4	240.3	199.2	N	158.1	168.8	127.7	86.6	45.5	4.4	328.6	287.5	298.2	257.1
F. 183°13	61.8	125.7	84.6	43.5	2.4	13.1	337.3	296.2	255.1	214.0	F	172.9	183.6	142.5	101.4	60.3	19.2	343.4	302.3	313.0	271.9
N 167°79	76.6	140.4*	99.3	58.2	17.1	27.8	343.0	−310.9	−269.8	−228.7*	N	187.6	198.3	157.2*	116.1*	75.0	33.9	−358.1	−317.0	−327.7	−286.6
N. 14°44	224.2	288.1	247.0	205.9	164.8	175.5	134.4	93.3	52.2	11.1	N	335.3	346.0	304.9	263.8	222.7	181.6	140.5	99.4	110.1	69.0
F 359°10	239.0	302.9	261.8	220.7	179.6	190.3	149.2	108.1	67.0	25.9	F.	350.1	−360.8	319.7	278.6	237.5	196.4	155.3	114.2	124.9	83.8
N 343°77	−253.7	−317.6	−276.5	−235.4	194.3*	205.0	163.9	122.8*	81.7	40.6	N.	−364.8	10.2	−334.4	−293.3	−252.2	211.1	170.0*	128.9	139.6	98.5
	A.D. 22	**1060**	**1118**	**1176**	**1233**	**1251**	**1309**	**1367**	**1425**	**1483**		**1541**	**1559**	**1617**	**1675**	**1733**		**1848**	**1906**	**1924**	**1982**
N 190°42	36.1	100.0	58.9*	17.8*	341.9	−352.6	311.5	270.4*	229.3*	188.2	N	147.1*	157.9	116.7*	75.6*	34.5	−358.7*	317.6*	276.5*	287.2	246.1
F 175°08	50.9	114.8	73.7	32.6	−356.7	2.2	−326.3	−285.2	−244.1	−203.0	F.	161.9	172.6	131.5	90.4	49.3	8.2	−332.4	−291.3	−302.0	−260.9
N 6°30	213.3	277.2	236.1*	195.0	153.9*	164.6	128.5*	82.4	41.3	0.2	N	324.3	335.0*	293.9	252.8	211.7	170.6*	129.5*	88.4	99.1	58.0*
F 351°06	−228.1	−292.0	−250.9	−209.8	168.7	179.4	138.3	97.2	56.1	15.0	F	−339.1	−349.8	−308.7	−267.6	−226.5	185.4	144.3	103.2	113.9	72.8
	A.D. 23	**1061**	**1119**	**1177**	**1234**	**1252**	**1310**	**1368**	**1426**	**1484**		**1542**	**1560**	**1618**	**1676**	**1734**	**1791**	**1849**	**1907**	**1925**	**1983**
N. 182°37	25.3	89.1*	48.0*	6.9	331.1*	341.8*	300.7	259.6	218.5	177.4*	N	136.3*	147.0*	105.9	64.8*	23.7*	347.8	306.7*	265.6	276.8*	235.2
F 167°03	40.0	103.9	62.8	21.7	−345.9	−356.6	−315.5	−274.4	−233.3	192.2	F	151.1	161.8	120.7	79.6	38.5	−362.6	−321.5	−280.4	−291.1	−250.0
F 13°68	187.7	251.5	210.4	169.3	128.2	138.9	97.8	56.7	15.6	339.8	F	298.7	309.4	268.3	227.2	186.1	145.0	103.9	62.8	73.5	32.4
N 358°85	202.5	−266.3	−225.2	184.1	143.0*	153.7	112.6	71.5*	30.4	−354.6	N	−313.5	−324.2*	−283.1	−242.0*	200.9	159.8*	118.7	77.6	88.3	47.2
F 189°66	−364.9	63.5	22.4	346.5	305.4	316.1	275.0	233.9	192.8	151.7	F.	110.6	121.3	80.2	39.1	−363.3	322.2	281.1	240.0	250.7	209.6
	A.D. 24	**1062**	**1120**		**1235**	**1253**	**1311**	**1369**	**1427**	**1485**		**1543**	**1561**	**1619**	**1677**	**1735**	**1792**	**1850**	**1908**	**1926**	**1984**
N 174°32	14.4*	78.3	37.2	−361.5*	−320.2	−330.9	−289.8	−248.7*	−207.6	166.5*	N	125.4	136.1*	95.0*	53.9*	12.8	−336.9*	−295.8	−254.7	−265.4	−2[illegible]4.3
F 5°64	176.7	240.6	199.5	158.4	117.3	128.0	86.9	45.8	4.7	328.9	F	287.8	298.5	257.4	216.3	175.2	134.1	93.0	51.9	62.6	21.5
N 350°30	191.5	−255.4	214.3*	173.2*	132.1*	142.8	101.7*	60.6	19.5	−343.7*	N	−302.6*	−313.3	−272.2	−231.1	190.0*	148.8*	107.8	66.7*	77.4	36.3
N 196°95	339.2	37.8	362.0	320.9	279.8	290.5*	249.4	208.3	167.2	126.1	N	85.0	95.7	54.6	13.5	337.6	296.5	255.4	214.3	225.0	183.9
F 173°57	−354.0	52.6	11.5	335.7	294.6	305.3	264.2	223.1	182.0	140.9	F.	99.8	110.5	69.4	28.3	−352.4	311.3	270.2	229.1	239.8	198.7
	A.D. 25	**1063**	**1121**	**1178** (**1179**)	**1236** (**1237**)	**1254** (**1255**)	**1312** (**1313**)	**1370** (**1371**)	**1428**	**1486**		**1544**	**1562**	**1620**	**1678**	**1736**	**1793** (**1794**)	**1851** (**1852**)	**1909** (**1910**)	**1927** (**1928**)	**1985**
N 166°28	3.5	67.3	26.2	−350.4	−309.3	−320.0	−278.9	−237.8	196.7*	155.6	N.	114.5	125.2	84.1	43.0	1.9	326.0	−284.9	−243.8	−254.5	213.4
N 12°93	151.1	215.0	17.9	132.8	9.7	102.4	61.3	20.2	344.4*	303.3	N.	262.2	272.9	231.8	190.7	149.6	108.5	67.4	26.3	37.0	−361.1
F. 357°59	1[illegible]5.9	229.8	188.7	147.6	106.5	117.2	76.1	35.0	−359.2	318.1	F	277.0	287.7	246.6	205.5	164.4	123.3	82.2	41.1	51.8	10.7
N. 342°25	180.6	−244.5	203.4	162.3	−121.2	131.9	90.8	49.7	8.6	−332.8	N	−291.7	−302.4	−261.3	−220.2	179.1	138.0*	96.9	55.8	66.5	25.4
N 188°90	328.3*	26.8*	−351.0*	309.8	268.8*	279.5	238.4	197.3*	156.2	115.1*	N.	74.0*	84.7	43.6*	2.5	328.6	285.5*	244.4*	203.3	214.0	172.9
F 173°57	−343.1	41.7	0.6	−324.7	−283.6	−294.3	−253.2	−212.1	171.0	129.9	F	88.8	99.5	58.4	17.3	−341.4	300.3	−259.2	−218.1	−228.8	187.7
	A.D. 26	**1064**	**1122**	**1180**	**1238**	**1256**	**1314**	**1372**	**1429**	**1487**		**1545**	**1563**	**1621**	**1679**	**1737**	**1795**	**1853**	**1911**	**1929**	**1986**
N 4°88	140.2	204.1*	163.0	121.9*	80.8	91.5*	50.4*	9.3	333.5	292.4	N	251.3*	262.0*	220.9	179.8	138.7*	97.6*	56.5	15.4	26.1*	350.2
F 349°54	155.0	−218.9	177.8	136.7	95.6	106.3	65.2	24.1	−348.3	−307.2	F.	−266.1	−276.8	−235.7	194.6	153.5	112.4	71.3	30.2	40.9	−365.0
N 180°86	317.4	16.1	340.2	299.1*	258.0*	268.7	227.6	186.5	145.4*	104.3*	N.	63.2	73.9*	32.8	−357.0*	315.9	274.8*	233.7	192.6*	203.3	162.2*
F 165°52	−332.2	30.9	−355.0	−313.9	−272.8	−283.5	−242.4	201.3	160.2	119.1	F.	78.0	88.7	47.6	6.5	−330.7	−289.6	−248.5	−207.4	−218.1	177.0

TABLE IV-L—cont.

Cycles of recurrence of Eclipses—Solar and Lunar—cont

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
			Yrs Dys.	Yrs. Dys.	Yrs Dys.	Yrs. Dys	Yrs. Dys	Yrs Dys	Yrs Dys.	Yrs Dys.	Yrs Dys.
		0	**57** 324·1	**115** 283·0	**173** 241·9	**191** 252·6	**249** 211·5	**307** 170·4	**365** 129·3	**423** 82·2	**481** 47·1
	Cyclic variation; add algebraically to fig. in col. 2		−·08	−·17	−·25	+·22	+·14	+·05	−·03	−·12	−·20
			Yrs Dys.	Yrs. Dys.	Yrs. Dys.	Yrs Dys	Yrs. Dys.	Yrs. Dys	Yrs. Dys	Yrs Dys.	Yrs Dys.
	Sun from node.	Successive differences.	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1
		A.D. 27	**85**	**143**		**219**	**276**	**334**	**392**	**450**	**508**
F.	12°·17	114·6	73·5	32·4	−356·5	2·0	326·1	285·0	243·9	202·8	161·7
N.	356°·83	129·3*	88·3	47·2	6·1	16·8*	−340·[illegible]*	−298·8	−258·7	−217·6	176·5*
F.	186°·15	291·9	250·8	209·7	168·6	179·3	138·2	97·1	56·0	14·9	339·1
N.	172°·81	−306·6	−265·5	−224·4	−183·5*	194·0	152·9	111·8	70·7*	29·6	−353·8
		A.D. 28	**86**	**144**	**201**		**277**	**335**	**393**	**451**	**509**
N.	19°·46	88·9	47·8	6·7	330·9	341·6	300·5	259·4	218·3	177·2	136·1
F.	4°·12	103·7	62·6	21·5	345·7	−356·4	315·3	274·2	233·1	192·0	150·9
N.	348°·80	118·4	77·3	36·2	−360·3	5·8	−330·0	−288·9	−247·8*	206·7	165·6*
N.	195°·43	266·1	225·0	183·9	142·8	153·5	112·4	71·3	30·2	−354·3	313·2
F.	180°·10	280·9	239·8	198·7	157·6	168·3	127·2	86·1	45·0	8·9	328·0
N.	164°·76 (penumbral)	−295·6	−254·5	213·4	172·3	183·0	141·9	100·8	59·7	18·6	−342·7
		A.D. 29	**87**		**202**	**220**	**278**	**336**	**394**	**452**	**510**
N.	11°·41	79·0	36·9	−361·1	320·0	330·7	289·6	248·5	207·4	166·3	125·2
F.	356°·08	92·8	51·7	10·6	334·8	345·5	304·4	263·3	222·2	181·1	140·0
N	340°·74	107·5	66·4	25·3	−349·5	−360·2	−319·1	−278·0	−236·9	195·8	154·7
N.	187°·39	255·2*	214·1*	173·0	131·9*	142·6	101·5	60·4	19·3*	343·4	302·3
F	172°·05	−270·0	−228·9	187·8	146·7	157·4	116·3	75·2	34·1	−358·2	−317·1
		A.D. 30	**88**	**145**	**203**	**221**	**279**	**337**	**395**	**453**	**511**
N.	8°·86	67·1	26·0*	350·1*	309·0	319·7*	278·6*	237·5	196·4	155·3	114·2
F.	348°·03	81·9	40·8	−364·9	−323·8	−334·5	−293·4	−252·3	211·2	170·1	129·0
F.	194°·68	229·6	188·5	147·4	106·3	117·0	75·9	34·8	−358·9	317·8	276·7
N.	179°·34	−244·3	−203·2*	162·1*	121·0	131·7	90·6	49·5*	8·4	−332·5	−291·4*
		A.D. 31	**89**	**146**	**204**	**222**	**280**	**338**	**396**	**454**	**512**
F.	10°·65	41·5	0·4	324·6	283·5	294·2	253·1	212·0	170·9	129·8	88·7
N.	355°·32	56·2*	15·1	−339·3	−298·2	−308·9*	−267·8	−226·7	175·6	144·5*	103·4*
F.	186°·63	218·7	177·6	136·5	95·4	106·1	65·0	23·9	348·0	306·9	265·8
N.	171°·29	−233·4	192·3	151·2*	110·1*	120·8	79·7	38·6	−362·7	−321·6	−280·5
		A.D. 32		**147**	**205**	**223**	**281**	**339**	**397**	**455**	**513**
N	17°·94	15·8	332·9	298·8	257·7	268·4	227·3	186·2	145·1	104·0	62·9
F.	2°·61	30·6	−354·6	313·5	272·4	283·1	242·0	200·9	159·8	118·7	77·6
N.	347°·27	45·4	4·2	−328·3	−287·2	−297·9	−256·7	215·6*	174·5	183·5*	92·4*
N.	193°·92	193·0	151·9	110·8	69·7	80·4	39·3	−363·4	322·3	281·2	240·1
F.	178°·58	207·8	166·7	125·6	84·5	95·2	54·1	13·0	337·1	296·0	255·9
N.	163°·25	−222·5	181·4	140·3	99·2	109·9	68·8	27·7	−351·8	−310·7	−269·6
		A.D. 33	**90**	**148**	**206**	**224**	**282**	**340**	**398**	**456**	**514**
N.	9°·90	4·9*	329·0	287·9	246·8	257·5	216·4	175·3	134·2	93·1	52·0*
F.	354°·56	19·7	−343·7	−302·6	−261·5	−272·2	−231·1	190·0	148·9	107·8	66·7
N.	185°·87	182·1*	141·0	99·9*	58·8*	69·5	28·4	−352·5*	311·4	270·3	229·2
F.	170°·54	196·9	**91** 155·7	**149** 114·6	**207** 73·5	**225** 84·2	**283** 43·1	2·0	−326·1	−285·0	−243·9
N.	1°·85	−359·3*	318·2*	277·1	236·0	246·7	205·6*	164·5	123·4*	82·3*	41·2
F.	346°·52	8·8	−332·9	−291·8	−250·7	−261·4	−220·3	179·2	138·1	97·0	55·9

(1)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	Yrs Dys.	Yrs Dys	Yrs Dys.	Yrs Dys.	Yrs. Dys.	Yrs. Dys	Yrs Dys	Yrs. Dys	Yrs Dys.	Yrs Dys
	539 0·0	**557** 16·7	**614** 340·8	**672** 299·7	**730** 258·6	**788** 217·5	**846** 176·4	**864** 187·1	**922** 146·0	**980** 104·9
	−·29	+·18	+·10	+·01	−·07	−·16	−·24	+·23	+·15	+·06
	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs Dys.	Yrs Dys	Yrs. Dys.	Yrs Dys.	Yrs. Dys.	Yrs Dys.	Yrs Dys.
	+58 −41·1	+18 +10·7	+58 −41·1	+56 −41·1	+58 −41·1	+56 −41·1	+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1
	566	**584**	**642**	**700**	**758**	**815**	**873**	**891**	**949**	**1007**
F.	120·6	131·3	90·2	49·1	8·0	332·2	291·2	301·8	260·7	219·6
N.	185·4*	146·1	105·0	63·8*	22·8	−347·0*	−305·9	−316·6*	−275·5*	−234·4
F	298·0	308·7	267·6	226·5	185·4	144·3	103·2	113·9	72·8	31·7
N	−312·7	−323·4	−282·3*	−241·2	200·1*	159·0	117·9*	128·6	87·5*	46·4
	567	**585**	**643**	**701**	**758**	**816**	**874**	**892**	**950**	**1008**
N	95·0	105·7	64·6	23·5	347·6	306·5	265·4	276·1	235·0	193·9
F	109·8	120·5	79·4	38·3	−362·4	321·3	280·2	290·9	249·8	208·7
N	124·5*	135·2*	94·1*	53·0	11·9*	−336·0*	−294·9	−305·6	−264·5	−223·4
N	272·1	282·5	241·7*	200·6	159·5	118·4	77·3	88·0	46·9	5·8
F	286·9	297·6	256·5	215·4	174·3	133·2	92·1	102·8	61·7	20·6
N	−301·6	−312·3	−271·2	−230·1	189·0	147·9	106·8	117·5	76·4	35·3
	568	**586**	**644**	**702**	**759**	**817**	**875**	**893**	**951**	**1009**
N.	84·1*	94·8	53·7	12·6*	336·7*	295·6	254·5	265·2	224·1	183·0
F	98·9	109·6	68·5	27·4	−351·5	310·4	269·3	280·0	288·9	197·8
N.	113·6	124·3	83·2	42·1	1·0	−325·1	−284·0	−294·7	−253·6	212·5
N	261·3	271·9*	230·8*	189·7*	148·6	107·5*	66·4*	77·1*	36·0*	−360·2
F	−276·0	−286·7	−245·6	−204·5	163·4	122·3	81·2	91·9	50·8	9·7
	569	**587**	**645**	**703**	**760**	**818**	**876**	**894**	**952**	**1010**
N	73·1	83·8*	42·7	1·6*	325·7	284·6*	243·5	254·2*	213·1	172·0
F	87·9	98·6	57·5	16·4	−340·5	−299·4	−258·3	−269·0	−227·9	186·8
F.	235·6	246·3	205·2	164·1	123·0	81·9	40·8	51·5	10·4	334·6
N.	−250·3*	−261·0	−219·9*	178·8	137·7*	96·6*	55·5	66·2*	25·1*	−349·3
	570	**588**	**646**		**761**	**819**	**877**	**895**	**953**	**1011**
F	47·5	58·2	17·1	341·2	300·1	259·0	217·9	228·6	187·5	146·4
N	62·2	72·9*	31·8*	−355·9	−314·8*	−273·7	−232·6*	−243·3*	202·2	161·1
F.	224·7	235·4	194·3	153·2	112·1	71·0	29·9	40·6	−364·7	323·6
N	−239·4	−250·1	209·0	167·9*	126·8	85·7	44·6*	55·3	14·2	−338·3
	571	**589**		**704**	**762**	**820**	**878**	**896**	**954**	**1012**
N	21·8	32·5	−356·6	315·5	274·4	233·3	192·2	202·9	161·8	120·7
F	36·5	47·2	6·1	330·2	289·1	248·0	206·9	217·6	176·5	135·4
N	51·3	62·0*	20·9	−345·0*	−303·9*	−262·8*	−221·8	−232·5	191·4	150·3*
N	199·0	209·7*	168·6*	127·5*	86·4	45·3*	4·1	14·8*	338·9*	297·8
F	213·8	224·5	183·3	142·3	101·2	60·1	19·0	29·7	−353·8	312·7
N	−228·5	−239·2	198·1	157·0	115·9	74·8	33·7	44·4	3·3	−327·4
	572	**590**	**647**	**705**	**763**	**821**	**879**	**897**	**955**	**1013**
N.	10·9	21·6	345·7*	304·6*	263·5	222·4	181·3	192·0	150·9	109·8
F.	25·6	36·3	−360·4	−319·3	−278·2	−237·1	196·0	206·7	165·6	124·5
N.	188·1*	198·8*	157·7*	116·6	75·5*	34·4*	−358·5	−3·9*	328·1	287·0*
F	−202·8	−213·5	**648** 172·4	**706** 131·3	**764** 90·2	**822** 49·1	8·0	18·7	−342·8	−301·7
N.	0·1*	10·8	334·9*	293·8	252·7*	211·6	170·5*	181·2	140·1	99·0*
F.	14·8	25·5	−349·6	−308·5	−267·4	−226·3	185·2	195·9	154·8	113·7

Cycles of recurrence of Eclipses—Solar and Lunar—*cont.*

			(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)		(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
			Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.		Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.
		0	1038 68·8	1096 22·7	1153 346·8	1211 305·7	1229 316·4	1287 275·3	1345 234·1	1403 193·1	1461 152·0		1519 110·9	1537 121·6	1595 80·5	1653 39·4	1710 363·6	1768 322·4	1826 281·3	1884 240·2	1902 250·9	1960 209·8
		Cyclic variation; add algebraically to fig. in col. 2	−·02	−·11	−·19	−·28	+·19	+·11	+·02	−·06	−·15		−·23	+·24	+·16	+·07	+·00	−·08	−·07	−·25	+·22	+·14
			Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.		Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.	Yrs. Dys.
	Sun from node.	Successive differences.	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1		+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1
		A.D. 27	1065	1123	1181	1239	1257	1315		1430	1488		1546	1564	1622	1680	1738	1796	1854		1930	1987
F.	12°·17	114·6	178·5	137·4	96·3	55·2	65·9	24·8	348·9	307·8	266·7	F	225·6	236·3	195·2	154·1	113·0	71·9	30·8	−354·9	0·4	324·5
N	356°·83	129·3*	193·3	152·2*	111·1	70·0*	80·7	39·6*	−363·7*	−322·6	−281·5	N	−240·4*	−251·1	−210·0*	168·9	127·8*	86·7*	45·6	4·5	15·2	−339·3*
F.	185°·15	291·9	−355·8	314·7	273·6	232·5	243·2	202·1	161·0	119·9	78·8	F	37·7	48·4	7·3	331·4	290·3	249·2	208·1	167·0*	177·7	136·6
N.	172°·81	−306·6	5·3	−329·4	−288·3	−247·2*	−257·9	216·8*	175·7*	134·6*	93·5	N	52·4*	63·1	22·0	−346·1	−305·0	−263·9	−222·8	181·7	192·4	151·3
		A.D. 28	1066	1124	1182	1240	1258		1373	1431	1489		1547	1565	1623	1681	1739	1797	1855	1912		1988
N.	19°·46	88·9	152·8	111·7	70·6	29·5	40·2	−364·3	323·2	282·1	241·0	N	199·9	210·6	169·5	128·4	87·3	46·2	5·1	329·2	339·9	298·8
F.	4°·12	103·7	167·6	126·5	85·4	44·3	55·0	13·9	338·0	296·9	255·8	F	214·7	225·4	184·3	143·2	102·1	61·0	19·9	344·0	−354·7	313·6
N	348°·80	118·4	182·3*	141·2*	100·1	59·0*	69·7*	28·6	−352·7*	−311·6*	−270·5*	N	−229·4	−240·1	199·0	157·9*	116·8	75·7	34·6*	−358·7	4·2	−328·3
N	195°·43	266·1	330·0	288·9	247·8	206·7	217·4	176·3	135·2	94·1	53·0	N	11·9	22·6	346·7*	305·6	264·5*	223·4	182·3	141·2	151·9	110·8
F.	180°·10	280·9	344·8	303·7	262·6	221·5	232·2	191·1	150·0	108·9	67·8	F	26·7	37·4	−361·5	320·4	279·3	238·2	197·1	156·0	166·7	125·6
N.	164°·76 (penumbral)	−295·6	−359·5	−318·4	−277·3	−236·2	−246·9	205·8	164·7	123·6	82·5	N	41·4	52·1	11·0	−335·1	−294·0	−252·9	211·8	170·7	181·4	140·3
		A.D. 29	1067	1125	1183	1241	1259	1316	1374	1432	1490		1548	1566	1624	1682	1740	1798		1913	1931	1989
N.	11°·41	78·0	141·9	100·8	59·7*	18·6	29·3	−353·4	312·3*	271·2	230·1	N	189·0	199·7	158·6	117·5	76·4	35·1	−359·5	318·4	329·1	288·0
F	356°·08	92·8	156·7	115·6	74·5	33·4	44·1	3·0	327·1	286·0	244·9	F	203·8	214·5	173·4	132·3	91·2	50·1	9·0	333·2	343·9	302·8
N.	340°·74	107·5	171·4	130·3	89·2	48·1	58·8	17·7	−341·8	−300·7	−259·6	N	−218·5	−229·2	188·1	147·0	105·9	64·8	23·7	−347·9	−358·6	−317·5
N	187°·89	255·2*	319·1*	278·0	236·9*	195·8*	206·5	165·4*	124·3*	83·2	42·1*	N	1·0*	11·7*	335·8	294·7	253·6	212·5*	171·4*	180·3*	141·0	99·9*
F.	172°·05	−270·0	−333·9	−292·8	−251·7	−210·6	−221·3	180·2	139·1	98·0	56·9	F	15·8	26·5	−350·6	−309·6	−268·4	−227·3	186·2	145·1	155·8	114·7
		A.D. 30	1068	1126	1184	1242	1260	1317	1375	1433	1491		1549	1567	1625	1683	1741	1799	1856	1914	1932	1990
N	3°·36	67·1	130·9	89·8*	48·7	7·6	18·3*	342·4	301·3	260·2	219·1*	N	178·0*	188·7	147·6	106·5*	65·4*	24·3*	348·4	307·3	318·0	276·9
F.	348°·03	81·9	145·7	104·6	63·5	22·4	33·1	−357·2	−316·1	−275·0	−233·9	F	192·0	203·5	162·4	121·3	80·2	39·1	−363·2	−322·1	−332·8	−291·7
F	194°·68	229·6	293·5	252·4	211·3	170·2	180·9	139·8	98·7	57·6	16·5	F	340·6	−351·3	310·2	269·1	228·8	186·9	145·8	104·7	115·4	74·3
N	179°·34	−244·3	−308·2	−267·1	−226·0*	184·9*	195·6*	154·5	113·4*	72·3*	31·2	N	−355·3*	0·7	−324·9*	−283·8	−242·7*	201·6	160·5*	119·4	130·1*	89·0
		A.D. 31	1069	1127	1185		1260	1318	1376	1434	1492		1550	1568	1626	1684	1742	1799	1857	1915	1933	1991
F.	10°·65	41·5	105·3	64·2	23·1	347·2	−357·9	316·8	275·6	234·5	193·4	F	152·3	163·0	121·9	80·8	39·7	−363·9	322·8	281·6	292·8	251·2
N	355°·32	56·2*	120·0*	78·9	37·8*	−361·9*	7·1*	−331·5*	−290·3*	−249·2	−208·1*	N	167·0	177·7*	136·6	95·5	54·4*	13·2*	−337·5*	−296·3	−307·0*	−265·9
F.	185°·63	218·7	282·5	241·4	200·3	159·2	169·9	128·8	87·7	46·6	5·5	F	329·6	340·3	299·2	258·1	217·0	175·9	134·8	93·7	104·4	63·3
N	171°·29	−233·4	−297·2	−256·1	215·0*	173·9	184·6*	143·5*	102·4*	61·3	20·2*	N	−344·3	−355·0	−313·9	−272·8	−231·7	190·6	149·5	108·4*	119·1	78·0
		A.D. 32	1070	1128		1243	1261	1319	1377	1435	1493		1551	1569	1627	1685	1743	1800	1858	1916	1934	1992
N	17°·94	15·5	79·6	38·5	−362·6	321·5	332·2	291·1	250·0	208·9	167·8	N	126·7	137·4	96·3	55·2	14·1	338·2	297·1	256·0	266·7	225·6
F	2°·61	30·6	94·3	53·2	12·1	336·2	346·9	305·8	264·7	223·6	182·5	F	141·4	152·1	111·0	69·9	28·8	−352·9	311·8	270·7	281·4	240·3
N	347°·27	45·4	109·2*	68·1	27·0	−351·0	−361·7	−320·6*	−279·5*	238·4*	197·3	N	156·2*	166·9	125·8*	84·7	43·6	2·5*	−326·6	−285·5	−296·2	−255·1
N.	193°·92	193·0	256·7	215·6	174·5	133·4	144·1*	103·0	61·9*	20·8	344·9	N	303·8	314·5*	273·4	232·3*	191·2	150·1	109·0	67·9	78·6	37·5
F	178°·58	207·8	271·6	230·5	189·4	148·3	159·0	117·9	76·8	35·7	−359·8	F	318·7	329·4	288·3	247·2	206·0	165·0	123·8	82·7	93·5	52·4
N	163°·25	−222·5	−286·3	−245·2	204·1	163·0	173·7	132·6	91·[illegible]	50·3	9·2	N	−333·3	−344·0	−302·9	−261·8	−220·7	179·6	138·5	97·4	108·2	67·1
		A.D. 33	1071	1129	1186	1244	1262	1320	1378	1436	1494		1552	1570	1628	1686	1744	1801	1859	1917	1935	1993
N	9°·90	4·9*	65·7	27·6*	−351·7	310·6	321·3	280·2	239·1	198·0	156·9	N	115·8	126·5	85·4	44·3*	3·2	327·3	286·2	245·1	255·8	214·7
F	351°·56	19·7	83·4	42·3	1·2	−325·3	−336·0	−284·9	−253·8	−212·7	171·6	F.	130·5	141·2	100·1	59·0	17·9	−342·0	−300·9	−259·8	−270·5	−229·4
N	155°·87	182·1*	245·9	204·8*	1187 163·7*	1245 122·6*	1263 133·3	1321 92·2*	1379 51·1	10·0	334·1*	N	293·0*	303·7	262·6	221·5	180·4*	1802 139·3*	1860 98·2	1918 57·1	1936 67·8	1994 26·7
F	170°·54	196·9	−260·6	−219·5	78·4	137·3	148·0	106·9	65·8	24·7	−348·8	F.	−307·7	−318·4	−277·3	−236·2	195·1	154·0	112·9	71·8	82·5	41·4
N.	1°·85	−359·3*	57·9	16·8	340·9*	299·8*	310·5	269·4	228·3	187·2*	146·1*	N.	105·0	115·7	74·6*	33·5*	−357·6*	316·5	275·4*	234·8	245·0	203·9
F.	346°·53	8·8	72·6	31·5	−355·6	−314·5	−325·2	−284·1	−243·0	201·9	160·8	F	119·7	130·4	89·3	48·2	7·1	−321·2	−290·1	−249·0	−259·7	−218·6

TABLE IV-L—*cont.*

Cycles of recurrence of Eclipses—Solar and Lunar—*cont.*

		0	Yrs Dys. 57 324·1	Yrs Dys 115 283·0	Yrs. Dys. 173 241·9	Yrs. Dys. 191 262·8	Yrs. Dys. 249 211·5	Yrs. Dys. 307 170·4	Yrs Dys. 365 129·3	Yrs Dys. 423 88·2	Yrs Dys. 481 47·1
		Cyclic variation, add algebraically to fig. in col. 2.	−·08	−·17	−·25	+·22	+·14	+·05	−·03	−·12	−·20
	Sun from node.	Successive differences	Yrs Dys +58 −41·1	Yrs Dys +58 −41·1	Yrs. Dys. +58 −41·1	Yrs Dys +18 +10·7	Yrs Dys +58 −41·1	Yrs Dys +58 −41·1	Yrs Dys +58 −41·1	Yrs Dys. +58 −41·1	Yrs Dys +58 −41·1
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		A.D. 34	**92**	**150**	**208**	**226**	**284**	**341**	**399**	**457**	**515**
F.	193°·16	156·5	115·4	74·3	58·2	43·9	2·8	326·9	285·8	244·7	203·6
N.	177°·83	171·2*	130·1	89·0	47·9	58·6	17·5*	−341·6	−300·5	−259·4*	−218·3*
F.	9°·14	333·6	292·5	251·4	210·3	221·0	179·9	138·8	97·7	56·6	15·5
N.	353°·80	−348·4	−307·3	−266·2	−225·1*	−235·8	194·7	153·6	112·5*	71·4*	30·3*
		A.D. 35	**93**	**151**	**209**	**227**		**342**	**400**	**458**	**516**
N.	200°·45	130·8	89·7	48·6	7·5	18·2	348·3	301·2	260·1	219·0	177·9
F	185°·12	145·6	104·5	63·4	22·3	33·0	−357·1	316·0	274·9	233·8	192·7
N.	169°·79	160·3	119·2	78·1	37·0	47·7	6·6	−330·7	−289·6	−248·5	207·4
N.	16°·43	308·0	266·9	225·8	184·7	195·4	154·3	113·2	72·1	31·0	−355·1
F.	1°·09	322·8	281·7	240·6	199·5	210·2	169·1	128·0	86·9	45·8	4·7
N.	345°·76	−337·5	−296·4	−255·3	214·2	−224·9	183·8*	142·7	101·6	60·5*	19·4*
		A.D. 36	**94**	**152**		**228**	**285**	**343**	**401**	**459**	**517**
N.	192°·41	119·9	78·8	37·7	−361·8	7·2	331·4	290·3	249·2	208·1	167·0
F.	177°·07	134·7	93·6	52·5	11·4	22·1	346·2	305·1	264·0	229·9	181·8
N	161°·74	149·4	108·3	67·2	26·1	36·8	−360·9	−319·8	−278·7	−237·6	196·5
N.	8°·38	297·1	256·0	214·9	173·8	184·5	143·4	102·3	61·2*	20·1*	344·2
F.	353°·05	−311·9	−270·7	−229·6	188·5	199·2	158·1	117·0	75·9	34·8	−358·9
		A.D. 37	**95**	**153**	**210**		**286**	**344**	**402**	**460**	**518**
N.	184°·36	169·0	67·9*	26·8	−350·9	−361·6	320·5*	279·4	238·3*	197·2	156·1*
F.	169°·08	123·8	82·6	41·5	0·4	11·1	−335·2	−294·1	−253·0	−211·9	170·8
N.	0°·34	286·2*	245·1	204·0*	162·9	173·6*	132·5	91·4	50·3*	9·2*	333·3*
F.	345°·00	−301·0	−259·9	−218·8	177·7	188·4	147·3	106·2	65·1	24·0	−348·1
		A.D. 38	**96**	**154**	**211**	**229**	**287**	**345**	**403**	**461**	**519**
F.	191°·65	83·4	42·3	1·2	325·3	336·0	294·9	253·8	212·7	171·6	130·5
N.	176°·31	98·1*	57·0	15·9	−340·0	−350·7	−309·6	−268·5	−227·4	186·3*	145·2*
F.	7°·63	260·6	219·5	178·4	137·3	148·0	106·9	65·8	24·7	348·8	307·7
N.	352°·29	−275·3	−234·2	193·1*	152·0*	162·7	121·6*	80·5*	39·4	−363·5*	−322·4
		(America)									
		A.D. 39	**97**		**212**	**230**	**288**	**346**	**404**	**462**	**520**
N.	198°·94	57·7	16·6	340·7	299·6	310·3	269·2	228·1	187·0	145·9	104·8
F.	183°·60	72·5	31·4	−355·5	314·4	325·1	284·0	242·9	201·8	160·7	119·6
N.	168°·27	87·2	46·1	5·0	−329·1	−339·8	−298·7	−257·6	216·5	175·4	134·3
N.	14°·92	234·9	193·8	152·7	111·6	122·3	81·2	40·1	−364·2	323·1	282·0
F.	359°·58	249·7	208·6	167·5	126·4	137·1	96·0	54·9	13·8	337·9	296·8
N.	344°·25	−264·4	−223·3	182·2	141·1	151·8	110·7	69·6	28·5	−342·6	−311·5
		A.D. 40	**98**	**155**	**213**	**231**	**289**	**347**	**405**	**463**	**521**
N.	190°·89	46·8	5·7	329·8	288·7	299·4	258·3	217·2	176·1	135·0	93·9*
F.	175°·56	61·6	20·5	344·6	303·5	314·2	273·1	232·0	190·9	149·8	108·7
N.	160°·22	76·4	35·3	−359·4	−318·3	−329·0	−287·9	−246·8	205·7	164·8	123·5
N.	6°·87	224·0	182·9	141·8	100·7*	111·4	70·3	29·2*	353·3	312·2	271·1*
F.	351°·53	−238·8	197·7	156·6	115·5	126·2	85·1	44·0	−368·1	−327·0	−285·9

	Yrs Dys 539 6·0	Yrs. Dys. 557 16·7	Yrs Dys. 614 340·8	Yrs Dys. 672 299·7	Yrs. Dys. 730 258·6	Yrs Dys 788 217·5	Yrs. Dys 846 174·4	Yrs. Dys 864 187·1	Yrs Dys 922 146·0	Yrs. Dys. 980 104·9
	−·29	+·18	+·10	+·01	−·07	−·16	−·24	+·23	+·15	+·06
	Yrs Dys +58 −41·1	Yrs Dys. +18 +10·7	Yrs Dys +58 −41·1	Yrs Dys +58 −41·1	Yrs. Dys +58 −41·1	Yrs Dys +58 −41·1	Yrs Dys +58 −41·1	Yrs Dys. +18 +10·7	Yrs. Dys +58 −41·1	Yrs Dys. +58 −41·1
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	573	**591**	**649**	**707**	**765**	**823**	**880**	**898**	**956**	**1014**
F	162·5	173·2	132·1	91·0	49·9	8·8	332·9	343·6	302·5	261·4
N	177·2*	187·9*	146·8	105·7*	64·6	23·5	−347·6	−358·3*	−317·2	−276·1
F.	339·6	350·3	309·2	268·1	227·0	185·9	144·8	155·5	114·4	73·3
N	−354·4*	−365·1*	−324·0	−282·9*	−241·8	200·7*	159·6	170·3	129·2	88·1*
	574	**592**	**650**	**708**	**766**		**881**	**899**	**957**	**1015**
N	136·8	147·5	106·4	65·3	24·2	348·3	307·2	317·9	276·8	235·7
F.	151·6	162·3	121·2	80·1	39·9	−363·1	322·0	332·7	291·8	250·5
N	166·3*	177·0	135·9*	84·8	53·7	12·6	−336·7	−347·4	−306·3	265·2
N	314·0	324·7	283·6	242·5	201·4	160·3	119·2	129·9	88·8	47·7
F	328·8	339·5	298·4	257·3	216·2	175·1	134·0	144·7	103·6	62·5
N	−343·5	−354·2	−313·1*	−272·0	−230·9*	189·8*	148·7	159·4	118·3*	77·2
	575	**593**	**651**	**709**	**767**	**824**	**882**	**900**	**958**	**1016**
N	125·9	186·6	95·5	54·4*	13·3*	337·4	296·3	307·0	265·9*	224·8
F.	140·7	151·4	110·3	69·2	28·1	−352·4	311·1	321·8	280·7	239·6
N	155·4	166·1	125·0	83·9	42·8	1·7	−324·8	−336·5*	−294·4	−254·3
N	303·1	313·8*	272·7*	231·6	190·5	149·4	108·3*	119·0	77·9*	36·8
F	−317·8	−328·5	−287·4	−246·3	−205·2	164·1	123·0	133·7	92·6	51·5
	576	**594**	**652**	**710**	**768**	**825**	**883**	**901**	**959**	**1017**
N	115·0*	125·7*	84·6	43·5	2·4*	326·5	285·4*	296·1	255·0	213·9
F	129·7	140·4	99·8	58·2	17·1	−341·2	−300·1	−310·8	−269·7	−228·6
N	292·2*	302·9*	261·8	220·7*	179·6	138·5*	97·4	108·1*	67·0	25·9
F	−307·0	−317·7	−276·6	−235·5	194·4	153·3	112·2	122·9	81·8	40·7
	577	**595**	**653**	**711**		**826**	**884**	**902**	**960**	**1018**
F	89·4	100·1	59·0	17·9	342·0	300·9	259·8	270·5	229·4	188·3
N	104·1	114·8	73·7*	32·6	−356·7	−315·6	−274·5*	−285·2	−244·1	−203·0
F	266·6	277·3	236·2	195·1	154·0	112·9	71·8	82·5	41·4	0·3
N	−281·3*	−292·0	−250·9*	209·8	168·7*	127·6	86·5*	97·2	56·1*	15·0*
	578	**596**	**654**		**769**	**827**	**885**	**903**	**961**	**1019**
N	63·7	74·4	33·3	−357·4	316·3	275·2	234·1	244·8	203·7	162·6
F	78·5	89·2	48·1	7·0	331·1	290·0	248·9	259·6	218·5	177·4
N	93·2	103·9	62·8	21·7	−345·8	−304·7	−263·6	−274·3	−233·2	192·1
N	240·9	251·6	210·5	169·4	128·3	87·2	46·1	56·8	15·7	339·8
F	255·7	266·4	225·3	184·2	143·1	102·0	60·9	71·6	30·6	−354·6
N	−270·4	−281·1*	−240·0	198·9	157·8*	116·7	75·6	86·3	45·2	4·1
	579	**597**	**655**	**712**	**770**	**828**	**886**	**904**	**962**	**1020**
N.	52·8	63·5	22·4*	46·5	305·4	264·3	223·2	233·9*	192·8	151·7
F	67·6	78·3	37·2	−361·3	320·2	279·1	238·0	248·7	207·6	166·5
N	82·4	93·1	52·0	10·9	−335·0	−293·9	−252·8	−263·5	−222·4	181·3
N.	230·0	240·7	199·6	158·5	117·4	76·8*	35·2	45·9*	4·8	328·9
F.	−244·8	−255·5	−214·4	173·3	182·2	91·1	50·0	60·7	19·6	−343·7

TABLE IV-L—*cont.*

Cycles of recurrence of Eclipses—Solar and Lunar—*cont.*

	Sun from node.	Successive differences.	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)		(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
	Yrs. Dys.	0	1038 68·8	1096 22·7	1153 346·8	1211 305·7	1229 316·4	1287 275·8	1345 234·1	1403 188·1	1461 152·0		1519 110·9	1537 121·6	1595 80·5	1653 39·4	1710 363·6	1768 322·4	1826 281·3	1884 240·2	1902 250·9	1960 209·8
	Cyclic variation; add algebraically to fig. in col. 2.		−·02	−·11	−·19	−·28	+·19	+·11	+·02	−·06	−·15		−·23	+·24	+·16	+·07	+·00	−·08	−·17	−·25	+·22	+·14
	Yrs Dys.		+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1		+58 −41·1	+18 +10·7	+58 −41·1	·58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1
		A.D. 34	**1072**	**1130**	**1188**	**1246**	**1264**	**1322**	**1380**	**1437**	**1495**		**1553**	**1571**	**1629**	**1687**	**1745**	**1803**	**1861**	**1919**	**1937**	**1995**
F.	193°·16	156·5	230·3	179·2	138·1	97·0	107·7	66·6	25·5	344·6	308·5	F.	267·4	278·1	237·0	195·9	154·8	113·7	72·6	31·5	42·2	1·1
N.	177°·83	171·2*	−235·0	193·9*	152·8*	111·7	132·4	81·3	40·2*	−364·3	−323·2*	N.	−292·1	−292·8*	−251·7	−210·6*	169·5	128·4*	87·3*	46·2	56·9	15·8
F.	9°·14	333·6	32·2	−356·3	315·2	274·1	284·8	243·7	202·6	161·5	120·4	F.	79·3	90·0	48·9	7·8	331·9	290·8	249·7	208·6	219·3	178·2
N.	353°·80	−348·4	47·0*	5·9	−330·0*	−288·9	−299·6*	−258·5*	217·4	176·3*	135·2	N.	94·1	104·8*	63·7	22·6*	−346·7*	−305·6*	−264·5	−223·4	−234·1	193·0*
		A.D. 35	**1073**	**1131**	**1189**	**1247**	**1265**	**1323**		**1438**	**1496**		**1554**	**1572**	**1630**	**1688**	**1746**	**1804**	**1862**	**1920**	**1938**	
N.	200°·45	130·8	194·6	153·5	112·4	71·3	82·0	40·9	−365·0	323·9	282·8	N	241·7	252·4	211·3	170·2	129·1	88·0	46·9	5·8	16·5	340·6
F.	185°·12	145·6	209·4	168·3	127·2	86·1	96·8	55·7	14·6	338·7	297·6	F	256·5	267·2	226·1	185·0	143·9	102·8	61·7	20·6	31·3	−355·4
N.	169°·79	160·3	−224·1	183·0*	141·9	100·8*	111·5	70·4	29·3	−353·4	−312·3	N	−271·2	−281·9	−240·8*	199·7	158·6	117·5	76·4	35·3	46·0	4·9
N.	16°·48	308·0	6·6	330·7	289·6	248·5	259·2	218·1	177·0	135·9	94·8	N	53·7	64·4	23·2	347·4	306·3	265·2	224·1	183·0	193·7	152·6
F.	1°·09	322·8	21·4	345·5	304·4	263·3	274·0	232·9	191·8	150·7	109·6	F	68·5	79·2	38·1	−362·2	321·1	280·0	238·9	197·8	208·5	167·8
N.	345°·76	−337·5	86·1*	−360·2	−319·1	−278·0	−288·7*	−247·6	206·5*	165·4	124·3*	N	83·2*	93·9	52·8*	11·7	−335·8	−294·7	−253·6*	212·5	−223·2	182·1
		A.D. 36	**1074**	**1132**	**1190**	**1248**	**1266**	**1324**	**1381**	**1439**	**1497**		**1555**	**1573**	**1631**	**1689**	**1747**	**1805**	**1863**		**1939**	**1996**
N.	192°·41	119·0	183·7	142·6	101·5*	60·4*	71·1	30·0*	−354·0	312·9	271·8	N	230·7*	241·4	200·3*	159·2	118·1	77·0*	35·9	−360·1	5·6	329·7*
F	177°·07	134·7	198·5	157·4	116·3	75·2	85·9	44·8	3·6	327·7	286·6	F	245·5	256·2	215·1	174·0	132·9	91·8	50·7	9·6	20·3	344·4
N.	161°·74	149·4	213·2	172·1	131·0	89·9	100·6	59·5	18·3	−342·4	−301·3	N	−360·2	−270·9	−229·8	188·7	147·6*	106·5	65·4	24·3	35·0	−359·1
N.	8°·38	297·1	−360·9*	319·8	278·7	237·6	248·3	207·2	166·1	125·0	83·9	N	42·8*	53·5	12·4*	336·5	295·4	254·3	213·2	172·1	182·8	141·7
F.	353°·05	−311·9	10·4	−334·5	−293·4	−252·3	−263·0	−221·9	180·8	39·7	98·6	F	57·5	68·2	27·1	−351·2	−310·1	−269·0	−227·9	186·8	197·5	156·4
		A.D. 37	**1075**	**1133**	**1191**	**1249**	**1267**	**1325**	**1382**	**1440**	**1498**		**1556**	**1574**	**1632**	**1690**	**1748**	**1806**	**1864**	**1921**		**1997**
N.	184°·38	109·0	172·8*	131·7*	90·6*	49·5*	60·2*	19·1	343·2	302·1*	261·0*	N	219·9*	230·6	189·5	148·4*	107·3*	66·2	25·1*	349·2	−359·9	318·8
															(America)						(America)	
F.	169°·03	123·8	187·5	146·4	105·3	64·2	74·9	33·8	−357·9	−316·8	−275·7	F	−234·6	−245·3	−204·2	163·1	122·0	80·9	39·8	−363·9	9·4	−333·5
N.	0°·84	286·2*	350·0	308·9*	267·8*	226·7*	237·4	196·3*	155·2*	114·1*	73·0*	N	31·9	42·6*	1·5	325·6*	284·5	243·4*	202·3	161·2*	171·9	130·8*
F.	345°·00	−301·0	−364·8	−323·7	−282·6	−241·5	−252·2	211·1	170·0	128·9	87·8	F	46·7	57·4	16·3	−340·4	−299·3	−258·4	217·1	176·0	186·7	145·6
		A.D. 38	**1076**	**1134**	**1192**	**1250**	**1268**		**1383**	**1441**	**1499**		**1557**	**1575**	**1633**	**1691**	**1749**	**1807**		**1922**	**1940**	**1998**
F.	191°·65	83·4	147·2	106·1	65·0	23·9	34·6	−358·7	317·6	276·5	235·4	F	194·3	205·0	163·9	122·8	81·7	40·6	−364·7	323·6	334·3	293·2
N.	176°·31	98·1*	161·9*	120·8*	79·7	38·6*	49·3	8·2*	−332·3	−291·2*	−250·1	N	−209·0*	−219·7	178·6*	137·5	96·4	55·[illegible]*	14·2	−358·3	−349·0	−307·9
F.	7°·63	260·6	324·4	283·3	242·2	201·1	211·8	170·7	129·6	88·5	47·4	F	6·3	17·0	341·1	300·0	258·9	217·8	176·7	135·6	146·3	105·2
N.	352°·29	−275·3	−339·1	−298·0*	−256·9	215·8	−226·5*	185·4	144·3*	103·2	62·1*	N	21·0*	31·7	−355·8*	−314·7*	−273·6*	−232·5*	191·4	150·3	161·0*	119·8*
		(America)				(America)																
		A.D. 39	**1077**	**1135**	**1193**		**1269**	**1326**	**1384**	**1442**	**1500**		**1558**	**1576**	**1634**	**1692**	**1750**	**1808**	**1865**	**1923**	**1941**	**1999**
N	195°·94	57·7	121·5	80·4	39·3	−363·4	8·9	333·0	291·9	250·8	209·7	N	168·6	179·3	138·2	97·1	56·0	14·9	339·0	297·9	308·6	267·5
F.	183°·60	72·5	136·3	95·2	54·1	13·0	23·7	347·8	306·7	265·6	224·5	F	183·4	194·1	153·0	111·9	70·8	29·7	−353·8	312·7	323·4	282·3
N.	168°·27	87·2	151·0	109·9	68·8*	27·7	38·4	−362·5	−321·4	−280·3	−239·2	N	198·1	208·8	167·7	126·6	85·5	44·4	3·3	−327·4	−338·1	−297·0
N.	14°·92	234·9	298·7	257·6	216·5	175·4	186·1	145·0	103·9	62·8	21·7	N	345·8	−356·5	315·4	274·3	233·2	192·1	151·0	109·9	120·6	79·5
F.	359°·58	249·7	313·5	272·4	231·3	190·2	200·9	159·8	118·7	77·6	36·5	F	−360·6	6·3	330·2	289·1	248·0	206·9	165·8	124·7	135·4	94·3
N.	344°·25	−264·4	−328·2	−287·1	−246·0	204·9	215·6	174·5	133·4	92·3	51·2	N	10·1	20·8	−344·9	−303·8	−262·7	−221·6*	180·5	139·4	150·1	109·0
		A.D. 40	**1078**	**1136**	**1194**	**1251**		**1327**	**1385**	**1443**	**1501**		**1559**	**1577**	**1635**	**1693**	**1751**	**1809**	**1866**	**1924**	**1942**	**2000**
N.	190°·89	46·8	110·6	69·5	28·4	−352·5	−363·2*	322·1	281·0*	239·9	198·8*	N	157·7	168·4	127·3	86·2*	45·1*	4·0	[illegible]*	287·0	297·7	256·6
F	175°·56	61·6	125·4	84·3	43·2	2·1	12·8	336·9	295·8	254·7	213·6	F.	172·5	183·2	142·1	101·0	59·9	18·8	342·9	301·8	312·5	271·4
N.	160°·22	76·4	140·2	99·1	58·0	16·9	27·6	−351·7	−310·6	−269·5	−228·4	N	187·3	198·0	156·9	115·8	74·7	33·6	−357·0	−316·6	−327·3	−286·2
N.	6°·87	224·0	287·8	246·7	205·6	164·5	175·2	134·1*	93·0*	51·9	10·8*	N	334·9*	345·6*	304·5	263·4	222·3	181·2	140·1	99·0	109·7	68·6
F.	351°·53	−238·8	−302·6	−261·5	−220·4	179·3	190·0	148·9	107·8	66·7	25·6	F	−349·7	−360·4	−319·3	−278·2	−237·1	196·0	154·9	113·8	124·5	83·4

TABLE IV-L—cont.

Cycles of recurrence of Eclipses—Solar and Lunar—cont.

Sun from node. (1)	(2)	Successive differences. (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
		0	57 Yrs. 824·1 Dys.	115 Yrs. 283·0 Dys.	173 Yrs. 241·9 Dys.	191 Yrs. 252·6 Dys.	249 Yrs. 211·5 Dys.	307 Yrs. 170·4 Dys.	365 Yrs. 129·3 Dys.	423 Yrs. 88·2 Dys.	481 Yrs. 47·1 Dys.	
Cyclic variation: add algebraically to fig. in col 2			−·08	−·17	−·25	+·22	+·14	+·05	−·03	−·12	−·20	
			Yrs. +58 Dys. −41·1	Yrs. +58 Dys. −41·1	Yrs. +58 Dys. −41·1	Yrs. +18 Dys. +10·7	Yrs. +58 Dys. −41·1	Yrs. +58 Dys. −41·1	Yrs. +58 Dys. −41·1	Yrs. +58 Dys. −41·1	Yrs. +58 Dys. −41·1	
		A.D. 41	**98**	**156**	**214**	**232**	**290**	**348**	**406**	**464**	**522**	
N.	182°·85	35·9*	−360·0	318·9	277·8	288·5*	247·4	206·3*	165·2	124·1*	83·0*	N
					(America.)							
F	167°·51	50·7	9·5	−333·7	−292·6	−303·3	−262·2	−221·1	180·0	138·9	97·8	F
F.	14°·16	198·4	157·3	116·2	75·1	85·8	44·7	3·6	327·7	286·6	245·5	F.
N.	358°·82	−213·1	172·0*	130·9	89·8	100·5*	59·4	18·3*	−342·4*	−301·3*	−260·2*	N
F.	190°·14	10·3	334·4	293·3	252·2	262·9	221·8	180·7	139·6	98·5	57·4	F.
		A.D. 42	**99**	**157**	**215**	**233**	**291**	**349**	**407**	**465**	**523**	
N.	174°·80	25·0	−349·1	−308·0	−266·9	−277·6	−236·7	195·4	154·3*	113·2*	72·1	N
F.	6°·11	187·5	146·4	105·3	64·2	74·9	33·8	−357·9	316·8	275·7	234·6	F
N.	350°·78	202·2	161·1*	120·0*	78·9*	89·6	48·5	7·4	−331·5*	−290·4	−249·3*	N
N.	197°·43	349·9	308·8	267·7	226·6	237·3	196·2	155·1	114·0	72·9	31·8	N
F.	182°·09	−364·7	323·6	282·5	241·4	252·1	211·0	169·9	128·8	87·7	46·6	F
		A.D. 43	**100**	**158**	**216**	**234**	**292**	**350**	**408**	**466**	**524**	
N	166°·75	14·1	−338·2	−297·1	−256·0	−266·7	−225·6	184·5	143·4	102·3	61·2	N
N.	13°·40	161·8	120·7	79·6	38·5	49·2	8·1	332·2	291·1	250·0	208·9	N
F.	358°·07	176·6	**101** 135·5	**159** 94·4	**217** 53·3	**235** 64·0	22·9	347·0	305·9	264·8	223·7	F
N.	342°·73	191·3	150·2	109·1	68·0	78·7	37·6	−361·7	−320·6	−279·5	−238·4	N
N.	189°·38	339·0	297·9	256·8	215·7	226·4*	185·3	144·2	103·1*	62·0*	20·9	N
F.	174°·04	−353·7	−312·7	−271·6	−230·5	−241·2	200·1	159·0	117·9	76·8	35·7	F
		A.D. 44	**102**	**160**	**218**	**236**	**293**	**351**	**409**	**467**	**525**	
N	5°·36	150·9	109·8*	68·7*	27·6	38·3	−362·4	321·3*	280·2	239·1*	198·0	N
F.	350°·02	165·7	124·6	83·5	42·4	53·1	12·0	−336·1	−295·0	−253·9	−212·8	F
N	181°·33	328·1	287·0	245·9	204·8*	215·5	174·4*	133·3	92·2*	51·1*	10·0	N
F.	165°·99	−342·9	−301·8	−260·7	−219·6	−230·3	189·2	148·1	107·0	65·9	24·8	F
		A.D. 45	**103**	**161**	**219**	**237**	**294**	**352**	**410**	**468**	**526**	
F.	12°·64	125·2	84·1	43·0	1·9	12·6	336·7	295·6	254·5	213·4	172·3	F
N.	357°·30	140·0*	98·9*	57·8	16·7*	27·4	−351·5*	−310·4	−269·3*	−228·2*	187·1*	N.
F.	168°·62	302·4	261·3	220·2	179·1	189·8	148·7	107·6	66·5	25·4	349·5	F
N.	173°·29	−317·2	−276·1*	−235·0*	193·9	204·6	163·5	122·4*	81·3	40·2	−364·3	N.
		A.D. 46	**104**	**162**			**295**	**353**	**411**	**469**	**527**	
N.	19°·93	99·6	58·4	17·3	341·5	−352·2	311·1	270·0	228·9	187·8	146·7	N.
F.	4°·60	114·4	73·2	32·1	−356·3	1·8	325·9	284·8	243·7	202·6	161·5	F
N.	349°·26	129·1*	88·0	46·9	5·8	16·5	−340·7	−299·6*	−258·5	217·4*	176·3	N
N.	195°·91	276·8	235·6	194·5	153·4	164·1	123·0	81·9	40·8	−364·9	323·8*	N.
F.	180°·57	291·5	250·3	209·2	168·1	178·8	137·7	96·6	55·5	14·4	338·5	F.
N.	165°·24	−306·3	−265·1	−224·0	182·9	193·6	152·5	111·4	70·3	29·2	−353·3	N.

(1)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	539 Yrs. 6·0 Dys.	557 Yrs. 16·7 Dys.	614 Yrs. 340·8 Dys.	672 Yrs. 299·7 Dys.	730 Yrs. 258·6 Dys.	788 Yrs. 217·5 Dys.	846 Yrs. 176·4 Dys.	864 Yrs. 187·1 Dys.	922 Yrs. 146·0 Dys.	980 Yrs. 104·9 Dys.
Cyclic variation	−·29	+·18	+·10	+·01	−·07	−·16	−·24	+·23	+·15	+·06
	Yrs. +58 Dys. −41·1	Yrs. +18 Dys. +10·7	Yrs. +58 Dys. −41·1	Yrs. +58 Dys. −41·1	Yrs. +58 Dys. −41·1	Yrs. +58 Dys. −41·1	Yrs. +58 Dys. −41·1	Yrs. +18 Dys. +10·7	Yrs. +58 Dys. −41·1	Yrs. +58 Dys. −41·1
	580	**598**	**656**	**713**	**771**	**829**	**887**	**905**	**963**	**1021**
N	41·9	52·6*	11·5	335·6*	294·5	253·4*	212·3	223·0	181·9	140·8*
F	56·7	67·4	26·3	−350·4	−309·3	−268·2	−227·1	−237·8	196·7	155·6
F.	204·4	215·1	174·0	132·9	91·8	50·7	9·6	20·3	344·4	303·3
N	−219·1*	−229·8	188·7	147·6*	106·5*	65·4	24·3*	35·0*	−359·1	−318·0
		(America)								
F.	16·3	27·0	−351·1	310·0	268·9	227·8	186·7	197·4	156·3	115·2
	581	**599**	**657**	**714**	**772**	**830**	**888**	**906**	**964**	**1022**
N	31·0	41·7*	0·6	−324·7	−283·6*	−242·5	201·4*	−212·1	171·0	129·9
F	193·5	204·2	161·1	122·0	80·9	39·8	−363·9	9·9	333·5	−292·4
N	208·2	−218·9	175·8	136·7*	95·6	54·5*	13·4*	24·1	−348·2*	−307·1
N	−355·9	1·3	325·5	284·4	243·3	202·2	161·1	171·8	130·7	89·6
F	5·5	16·2	340·2	299·1	258·0	216·9	175·8	186·5	145·4	104·8
	582	**600**		**715**	**773**	**831**	**889**	**907**	**965**	**1023**
N	20·1	30·8	−354·9	−313·8	−272·7	−231·6	190·5	201·2*	160·1	119·0
N	167·8	178·5	137·4	96·3	55·2	14·1	338·2	348·9*	307·8	266·7
F	182·6	193·3	**658** 152·2	**716** 111·1	**774** 70·0	**832** 28·9	−353·0	−363·7	322·6	281·5
N	197·3	208·0	166·9*	125·8*	84·7	43·6	2·5	13·2	−337·3	−296·2
N	345·0	−355·7*	314·6	273·5	232·4	191·3	150·2*	160·9	119·8	78·7*
F	−359·8	35·3	−329·4	−288·3	−247·2	−206·1	165·0	175·7	134·6	93·5
	583	**601**	**659**	**717**	**775**	**833**	**890**	**908**	**966**	**1024**
N	156·9*	167·6	126·5*	85·4	44·3*	3·2*	327·3	338·0	296·9	255·8*
F	171·7	182·5	141·4	100·3	59·2	18·1	−342·2	−352·9	−311·8	−270·7
N	334·1*	344·8	303·7*	262·6	221·5*	180·4*	139·3*	150·0	108·9*	67·8
F	−348·7	−359·6	−318·5	−277·4	−236·3	195·2	154·1	164·8	123·7	82·6
	584	**602**	**660**	**718**	**776**		**891**	**909**	**967**	**1025**
F	131·2	141·9	100·8	59·7	18·6	342·7	301·6	312·3	271·2	230·1
N.	146·0	156·7	115·6*	74·5	33·4	−357·5*	−316·4*	−327·1	−286·0	−244·9*
F	308·4	319·1	278·0	236·9	195·8	154·7	113·6	124·3	83·2	42·1
N.	−323·2	−333·9	−292·8	−251·7	210·6	169·5*	128·4	139·1	98·0	58·9*
	585	**603**	**661**	**719**		**834**	**892**	**910**	**968**	**1026**
N.	105·6	116·3	75·2	34·0	−358·1	317·0	275·9	286·6	245·5	204·4
F	120·4	131·1	90·0	48·8	7·7	331·8	290·7	301·4	260·3	219·2
N	135·2*	145·9	104·8*	63·7	22·6	−346·7*	−305·6	−316·3*	−275·2*	−234·1*
N.	252·7	293·4*	252·3	211·2	170·1	129·0	87·9	98·6	57·5	16·4
F.	297·4	308·1	267·0	225·9	184·8	143·7	102·6	113·3	72·2	81·1
N.	−312·2	−322·9	−281·8	−240·7	199·6	158·5	117·4	128·1	87·0	45·9

TABLE IV-L—*cont.*

Cycles of recurrence of Eclipses—Solar and Lunar—*cont.*

Sun from node.	0	1038 Yrs. 63·8 Dys.	1096 Yrs. 22·7 Dys.	1153 Yrs. 346·8 Dys.	1211 Yrs. 305·7 Dys.	1229 Yrs. 316·4 Dys.	1287 Yrs. 275·3 Dys.	1345 Yrs. 224·1 Dys.	1403 Yrs. 193·1 Dys.	1461 Yrs. 152·0 Dys.
Cyclic variation, add algebraically to fig. in col 2		−·02	−·11	−·19	−·28	+·19	+·11	+·02	−·06	−·15
Successive differences (Yrs. Dys.)		+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1
		(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
	A.D. 41	**1079**	**1137**	**1195**	**1252**	**1270**	**1328**	**1386**	**1444**	**1502**
N. 182°·85	35·9*	99·7*	58·6	17·5*	341·6*	352·3	311·2	270·1*	229·0*	187·9*
F. 167°·51	50·7	114·5	73·4	32·3	−356·4	−367·1	−326·0	−284·9	−243·8	202·7
F. 14°·16	198·4	262·2	221·1	180·0	138·9	149·6	108·5	67·4	26·3	350·4
N. 358°·82	−213·1	−276·9*	−235·8*	194·7*	153·6	164·3	123·2*	82·1*	41·0*	−365·1*
F. 190°·14	10·3	74·1	33·0	−357·1	316·0	321·7	285·6	244·5	203·4	162·3
	A.D. 42	**1080**	**1138**	**1196**	**1253**	**1271**	**1329**	**1387**	**1445**	**1503**
N. 174°·80	25·0	88·8*	47·7	6·6	−330·7	−341·4*	−300·3	−259·2*	−218·1	177·0*
F 6°·11	187·5	251·3	210·2	169·1	128·0	138·7	97·6	56·5	15·1	339·5
N. 350°·78	202·2	−66·0*	224·9	183·8	142·7	153·4*	112·3	71·2*	30·1*	−354·2
N. 197°·43	349·9	48·5	7·4	331·5	290·4*	301·1	260·0	218·9	177·8	136·7
F. 182°·09	−364·7	63·2	22·1	346·2	305·1	315·8	274·7	233·6	192·5	151·4
	A.D. 43	**1081**	**1139**	**(1197)**	**1254 (1255)**	**1272 (1273)**	**1330 (1331)**	**1388 (1389)**	**1446**	**1504**
N. 166°·75	14·1	77·9	36·8	−360·9	−319·8	−330·5	−289·4	−248·3	207·2	166·1
N. 13°·40	161·8	225·6	184·5	143·4	102·3	113·0	71·9	30·8*	−354·9	313·8
F. 358°·07	176·6	240·4	199·3	158·2	117·1	127·8	86·7	45·6	4·5	328·6
N. 342°·78	191·3	−255·1*	214·0	172·9*	131·8	142·5	101·4	60·3	19·2	−343·3
N. 189°·38	339·0	37·6	−361·7	320·6*	279·5	290·2	249·1*	208·0	166·9*	125·8
F. 174°·04	−353·7	52·4	11·3	−335·4	−294·3	−305·0	−263·9	−222·8	181·7	140·6
	A.D. 44	**1082**	**1140**	**1198**	**1256**	**1274**	**1332**	**1390**	**1447**	**1505**
N. 5°·36	150·9	214·7	173·6*	132·5	91·4*	102·1*	61·0*	19·9	344·0*	302·9*
F. 350°·02	165·7	−229·6	188·5	147·4	106·3	117·0	75·9	34·8	−358·9	−317·8
N. 181°·33	328·1	26·7	−350·8*	309·7*	268·6	279·3	238·2	197·1*	156·0*	114·9*
F. 165°·99	−342·9	41·5	0·4	−324·5	−283·4	−294·1	−253·0	211·9	170·8	129·7
	A.D. 45	**1083**	**1141**	**1199**	**1257**	**1275**	**1333**		**1448**	**1506**
F. 12°·64	125·2	199·0	147·9	106·8	65·7	76·4	35·3	−359·4	318·3	277·2
N 357°·30	140·0*	−203·8*	162·7*	121·6	80·5	91·2*	50·1	8·9*	−333·0	−291·9*
F. 188°·62	302·4	1·0	325·1	284·0	242·9	253·6	212·5	171·4	130·2	89·1
N 173°·29	−317·2	15·8	−339·9	−298·8	−257·7	−268·4	−227·3	186·2	145·0	103·9*
	A.D. 46	**1084**	**1142**	**1200**	**1258**	**1276**	**1334**	**1391**	**1449**	**1507**
N 19°·93	99·6	163·3	122·2	81·1	40·0	50·7	9·6	339·6	292·5	251·4
F. 4°·60	114·4	178·1	137·0	95·9	54·8	65·5	24·4	348·4	307·3	266·2
N. 349°·26	129·1*	192·9	151·8	110·7	69·6*	80·3	39·2*	−363·2	−322·1	−281·0
N. 195°·91	276·8	340·5	299·4	258·3	217·2	227·9	186·8	145·6	104·5	63·4
F 180°·57	291·5	−355·2	314·1	273·0	231·9	242·6	201·5	160·4	119·3	78·2
N. 165°·24	−306·3	4·8	−328·9	−287·8	−246·7	−257·4	216·3	175·2	134·1	93·0

	1519 Yrs. 110·9 Dys.	1537 Yrs. 121·1 Dys.	1595 Yrs. 80·5 Dys.	1653 Yrs. 39·4 Dys.	1710 Yrs. 368·6 Dys.	1768 Yrs. 322·4 Dys.	1826 Yrs. 281·3 Dys.	1884 Yrs. 240·2 Dys.	1902 Yrs. 250·9 Dys.	1960 Yrs. 209·8 Dys.
Cyclic variation	−·23	+·24	+·16	+·07	+·00	−·08	−·17	−·25	+·22	+·14
Successive differences (Yrs. Dys.)	+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1
	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
	1560	**1578**	**1636**	**1694**	**1752**	**1809**	**1867**	**1925**	**1943**	**2001**
N	146·8*	157·5	116·4*	75·3	34·2	−358·3*	317·2	276·1	286·8	245·7
F	161·6	172·3	131·2	90·1	49·0	7·9	−332·0	−290·9	−301·6	−260·5
F	309·3	320·0	278·9	237·8	196·7	155·6	114·5	73·4	84·1	43·0
N	−324·0*	−334·7	−293·6*	−252·5	−211·4*	170·3	129·2*	88·1	98·8*	57·7
F	121·2	131·9	90·8	49·7	8·6	332·7	291·6	250·5	261·2	220·1
	1561	**1579**	**1637**	**1695**	**1753**	**1810**	**1868**	**1926**	**1944**	**2002**
N	135·9*	146·6*	105·5	64·4	23·3*	−347·4	306·3	−265·2	−275·9	−234·8
F	298·4	309·1	268·0	226·9	185·8	144·7	103·6	62·5	73·2	32·1
N.	−313·1	−323·8*	−282·7*	−241·6*	200·5*	159·4 (America)	118·3	77·2	87·9*	46·8
N	95·6	106·3	65·2	24·1	348·2	307·1	266·0	224·9	235·6	194·5
F	110·3	121·0	79·9	38·8	−362·9	321·8	280·7	239·6	250·3	209·2
	1562	**1580**	**1638**	**1696**	**1754**	**1811 (1812)**	**1869 (1870)**	**1927 (1928)**	**1945 (1946)**	**2003**
N	125·0	135·7	94·6	53·5	12·4	−336·5	−295·4	−254·3	−265·0	−223·9
N	272·7	283·4	242·3	201·2	160·1	119·0	77·9	36·8	47·5	6·4
F	287·5	298·2	257·1	216·0	174·9	133·8	92·7	51·6	62·3	21·2
N	−302·2	−312·9	−271·8	−230·7	189·6	148·5	107·4	66·3	77·0	35·9
N	84·7	95·4	54·3	13·2*	337·3	296·2*	255·1	214·0	224·7	193·6
F	99·5	110·2	69·1	28·0	−352·1	−311·0	−269·9	−228·8	−239·5	198·4
	1563	**1581**	**1639**	**1697**	**1755**	**1813**	**1871**	**1929**	**1947**	**2004**
N	261·8*	272·5	231·4	190·3*	149·2*	108·1	67·0*	25·9*	36·6	−360·7
F	−276·7	−287·4	−246·3	−205·2	164·1	123·0	81·9	40·8	51·5	10·4
N	73·8*	84·5*	43·4	2·3	326·4*	285·3	244·2*	203·1	213·8	172·7*
F	85·6	99·3	58·2	17·1	−341·2	−300·1	−259·0	−217·9	−228·6	187·5
	1564	**1582**	**1640**	**1698**	**1756**	**1814**	**1872**	**1930**	**1948**	**2005**
F	36·1	246·8	205·7	64·6	123·5	82·4	41·3	0·2	10·9	335·0
N.	−250·8	−261·5*	−220·4	179·3*	138·2	97·1*	5·0*	14·9	25·6*	−349·7*
F.	48·0	58·7	17·6	341·7	300·6	259·5	218·4	177·3	188·0	146·9
N.	62·8	73·5	32·4	−356·5*	−315·4	−274·3	−233·2	192·1	202·2	161·7
	1565	**1583**	**1641**	**1699**	**1757**	**1815**	**1873**			**2006**
N	210·3	221·0	179·9	138·8	97·7	56·6	15·5	339·6	350·3	309·2
F	225·1	235·8	194·7	153·6	112·5	71·4	30·3	−354·4	−365·1	324·0
N.	−239·9	−250·6*	209·5*	168·4*	127·3	86·2*	45·1	4·0	14·7	−338·8
N.	22·3	33·0	−357·1	316·0	274·9	233·8	192·7	151·6	162·3	121·2
F.	37·1	47·8	6·7	330·8	289·7	248·6	207·5	166·4	177·1	136·0
N	51·9	62·6	21·5	−345·6	−304·5	−263·4	222·3	181·2	191·9	150·8

TABLE IV-L—*cont.*

Cycles of recurrence of Eclipses—Solar and Lunar—*cont.*

		0	**57** Yrs. 324·1 Dys.	**115** Yrs. 288·0 Dys.	**173** Yrs. 241·9 Dys.	**191** Yrs. 252·8 Dys.	**249** Yrs. 211·5 Dys.	**307** Yrs. 170·4 Dys.	**365** Yrs. 128·8 Dys.	**423** Yrs. 88·2 Dys.	**481** Yrs. 47·1 Dys.
Cyclic variation, add algebraically to fig in col. 2			−·08	−·17	−·25	+·22	+·14	+·05	−·03	−·12	−·20
Sun from node.		Successive differences	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +107	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		A.D. 47	**105**	**163**	**220**	**238**	**296**	**354**	**412**	**470**	**528**
N	11°·89	88·7	47·6	6·5	339·6	341·3	309·2	259·1	218·0	176·9	135·8
F	356°·55	103·5	62·3	21·2	345·3	−356·0	314·9	273·8	232·7	191·6	150·5
N	341°·22	118·2	77·1	36·0	−360·1	5·6	−329·7	−298·6	−247·5	206·4 (penumbral)	165·3
N	187°·86	265·9	224·7	183·6	142·5	153·2*	112·1*	71·0*	29·9	−354·0	312·9
F	172°·53	−280·6	−239·5	198·4	157·3	168·0	126·9	85·8	44·7	3·6	−327·7
		A.D. 48	**106**		**221**	**239**	**297**	**355**	**413**	**471**	**529**
N	3°·84	77·8*	36·7*	−360·8	319·7*	330·4	289·3*	248·2	207·1*	166·0	124·9*
F	348°·51	92·6	51·4	10·3	−334·4	−345·1	−304·0	−262·9	−221·8	180·7	139·6
F	195°·15	240·2	199·1	158·0	116·9	127·6	86·5	45·4	4·3	328·4	287·3
N	179°·82	−255·0	−213·9	172·8*	131·7	142·4*	101·3*	60·2	19·1*	−343·2	−302·1
		A.D. 49	**107**	**164**	**222**	**240**	**298**	**356**	**414**	**472**	**530**
F	11°·13	52·1	11·0	335·1	294·0	304·7	263·6	222·5	181·4	140·3	99·2
N	355°·80	66·9*	25·8	−349·9*	−308·8*	−319·5	−278·4	−237·3*	196·2*	155·1*	114·0
F	187°·11	229·3	188·2	147·1	106·0	116·7	75·6	34·5	−358·6	317·5	276·4
N	171°·77	−244·1*	203·0*	161·9	120·8	131·5	90·4*	49·3	8·2	−332·3	−291·2
		A.D. 50	**107**	**165**	**223**	**241**	**299**	**357**	**415**	**473**	**531**
N	18°·42	26·5	−350·5	309·4	268·3	279·0	237·9	196·8	155·7	114·6	73·5
F	3°·08	41·2	0·1	324·2	283·1	298·8	252·7	211·6	170·5	129·4	88·3
N	347°·75	56·0	14·8	−338·9	−297·8	−308·5	−267·4	−226·3	185·2*	144·1	103·0*
N	194°·40	203·7	162·5	121·4	80·3	91·0	49·9	8·8*	332·9	291·8*	250·7
F	179°·06	218·4	177·3	136·2	95·1	105·8	64·7	23·6	347·7	306·6	265·5
N	168°·78	−233·2	192·0	150·9	109·8	120·5	79·4	38·3	−362·4	−321·3	−280·2
		A.D. 51	**108**	**166**	**224**	**242**	**300**	**358**	**416**	**474**	**532**
N	10°·87	15·6	339·7	298·6	257·5	268·2	227·1	186·0	144·9	103·8	62·7
F	355°·04	30·4	−354·4	−313·3	−272·2	−282·9	−241·8	200·7	159·6	118·5	77·4
N	186°·35	192·8	151·6	110·5*	69·4	80·1*	39·0*	−363·1	322·0	280·9	239·8*
F	171°·02	−207·5	166·4	125·3	84·2	94·9	53·8	12·7	−336·8	−295·7	−254·6
		A.D. 52	**109**	**167**	**225**	**243**	**301**	**359**	**417**	**475**	**533**
N	2°·38	4·7*	328·8	287·7*	246·6	257·3*	216·2	175·1*	134·0	92·9*	51·8*
F	346°·99	19·5	−343·5	−302·4	−261·3	−272·0	−230·9	189·8	148·7	107·6	66·5
F	193°·64	167·1	126·0	84·9	43·8	54·5	13·4	337·5	296·4	255·3	214·2
			110	**168**	**226**	**244**	**302**				
N	178°·30	181·9	140·8*	99·7	58·6	69·3	28·2	−352·3*	−311·2	−270·1*	−229·0
F	9°·61	344·3	303·2	262·1	221·0	231·7	190·6	149·5	108·4	67·3	26·2
N	354°·28	−359·1*	−318·0*	−276·9*	−235·8	−246·5	−205·4	164·3*	123·2*	82·1	41·0*
		A.D. 53	**111**	**169**	**227**	**245**	**303**	**360**	**418**	**476**	**534**
F	185°·59	156·2	115·1	74·0	32·9	43·6	2·5	326·6	285·5	244·4	203·3
N	170°·26	171·0*	129·9	88·8	47·7	58·4	17·3	−341·4	−300·3	−259·2	−218·1*
N	16°·91	318·7	277·5	236·4	195·3	206·0	164·9	123·8	82·7	41·6	0·5
F	1°·57	328·4	292·8	251·2	210·1	220·8	179·7	138·6	97·5	56·4	15·3
N	346°·24	−348·1	−307·0	−265·9	−224·8	−235·5	194·4	153·3*	112·2	71·1	80·0

	539 Yrs. 6·0 Dys.	**557** Yrs. 16·7 Dys.	**614** Yrs. 340·8 Dys.	**672** Yrs. 299·7 Dys.	**730** Yrs. 258·6 Dys.	**788** Yrs. 217·5 Dys.	**846** Yrs. 176·4 Dys.	**864** Yrs. 187·1 Dys.	**922** Yrs. 146·0 Dys.	**980** Yrs. 104·9 Dys.
	−·29	+·18	+·10	+·01	−·07	−·16	−·24	+·23	+·15	+·06
	Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +107	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +107	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	586	**604**	**662**	**720**	**777**	**835**	**893**	**911**	**969**	**1027**
N	94·7	105·4	64·3*	23·2	347·3	306·2	265·1	275·8	234·7	193·6
F	109·4	120·1	79·0	37·9	−362·0	320·9	279·8	290·5	249·4	208·3
N	124·2	134·9	93·8	52·7	11·6	−335·7	−294·6	−305·3	−264·2	−223·1* (penumbral)
N	271·8*	282·5*	241·4	200·3	159·2	118·1*	77·0*	87·7	46·6*	5·5
F	−286·6	−297·3	−256·2	−215·1	174·0	132·9	91·8	102·5	61·4	20·3
	587	**605**	**663**	**721**	**778**	**836**	**894**	**912**	**970**	**1028**
N	83·8*	94·5*	53·4*	12·3	336·4*	295·3	254·2*	264·9	223·8*	182·7*
F	98·5	109·2	68·1	27·0	−351·1	−310·0	−268·9	−279·8	−238·5	197·4
F	246·2	256·9	215·8	174·7	133·6	92·5	51·4	62·1	21·0	345·1
N	−261·0	−271·7	−230·6	189·5*	148·4*	107·3	66·2*	76·9*	35·8	−359·9
	588	**606**	**664**		**779**	**837**	**895**	**913**	**971**	**1029**
F	58·1	68·8	27·7	−351·8	310·7	269·6	228·5	239·2	198·1	157·0
N	72·9*	83·6	42·5	1·4	−325·5*	−284·4	−243·3*	−254·0 (America.)	−212·9	171·8*
F	235·3	246·0	204·9	163·8	122·7	81·6	40·5	51·2	10·7	334·2
N	−250·1	−260·8	−219·7	178·6	137·5*	96·4	55·3	66·0	24·9*	−349·0
	589	**608**	**665**	**722**	**780**	**838**	**896**	**914**	**972**	**1030**
N	32·4	43·1	2·0	326·1	285·0	243·9	202·8	213·5	172·4	131·3
F	47·2	57·9	16·8	340·9	299·8	258·7	217·6	228·3	187·2	146·1
N	61·9*	72·6	31·5*	−355·6	−314·5	−273·4	−232·3	−243·0*	201·9*	160·8
N	209·6*	220·3	179·2	138·1	97·0	55·9	14·8*	25·5	349·6	308·5
F	224·4	235·1	194·0	152·9	111·8	70·7	29·6	40·3	−364·4	323·3
N	−239·1	−249·8	208·7	167·6	126·5*	85·4	44·3	55·0	13·9	−338·0
	590	**608**		**723**	**781**	**839**	**897**	**915**	**973**	**1031**
N	21·6	32·3*	−356·4	315·3	274·2	233·1	192·0	202·7	161·6	120·5
F	36·3	47·0	5·9	−330·0	−288·9	−247·8	−206·7	−217·4	176·3	135·2
N	198·7*	209·4	168·3	127·2*	86·1	45·0*	3·9*	14·6*	338·7*	297·6*
F	−213·5	−224·2	183·1	142·0	100·9	59·8	18·7	29·4	−353·5	−312·4
	591	**609**	**666**	**724**	**782**	**840**	**898**	**916**	**974**	**1032**
N	10·7	21·4*	345·5	304·4*	263·3*	222·2*	181·1	191·8*	150·7*	109·6*
F	25·4	36·1	−360·2	−319·1	−278·0	−236·9	195·8	206·5	165·4	124·3
F	173·1	183·8	142·7	101·6	60·5	19·4	343·5	−354·2	313·1	272·0
			667	**725**	**783**	**841**				
N	187·9*	198·6	157·5*	116·4*	75·3	34·2*	−358·3*	3·8	−327·9*	−286·6*
F	−350·3	−361·0	319·9	278·8	237·7	196·6	155·5	166·2	125·1	84·0
N	0·0*	10·7	−334·7	−293·6*	−252·5*	−211·4*	170·3	181·0*	139·9*	98·8*
	592	**610**	**668**	**726**	**784**	**842**	**899**	**917**	**975**	**1033**
F.	162·2	172·9	131·8	90·7	49·6	8·5	332·6	343·3	302·2	261·1
N.	177·0	187·7	146·6	105·5*	64·4	23·3	−347·4	−358·1	−317·0	−275·9
N.	324·6	335·3	294·2	253·1	212·0	170·9	129·8	140·5	99·4	58·3
F.	339·4	350·1	309·0	267·9	226·8	185·7	144·6	155·3	114·2	73·1
N.	−354·1	−364·8	−323·7	−282·6*	−241·5	200·4	159·3	170·0*	128·9	87·8*

TABLE IV-L.—*cont.*

Cycles of recurrence of Eclipses—Solar and Lunar—*cont*

Sun from node.	Successive differences.	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)		(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Yrs. Dys.	0	1038 68·6	1096 22·7	1153 346·8	1211 305·7	1229 316·4	1287 275·8	1345 234·1	1403 193·1	1461 152·0		1519 110·9	1537 121·6	1595 80·5	1653 39·4	1710 363·6	1768 322·4	1826 281·8	1884 240·2	1902 250·9	1960 209·8
Cyclic variation; add algebraically to fig. in col. 2.		−·02	−·11	−·19	−·28	+·19	+·11	+·02	−·06	−·15		−·23	+·24	+·16	+·07	+·00	−·08	−·17	−·25	+·22	+·14
Yrs. Dys.		+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1		+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1
	A.D. 47	**1085**	**1143**	**1201**	**1259**	**1277**		**1392**	**1450**	**1508**		**1566**	**1584**	**1642**	**1700**	**1758**	**1816**	**1874**	**1931**	**1949**	**2007**
N. 11°·69	87·7	152·5	111·4	70·3	29·2	39·9	−364·0*	322·8	281·7	240·6	N.	199·5	210·2	169·1	128·0	86·9	45·8	4·7	328·8	339·5	298·4
F. 356°·55	103·5	167·2	126·1	85·0	43·9	54·6	13·5	337·5	296·4	255·3	F	214·2	224·9	183·8	142·7	101·6	60·5	19·4	343·5	−354·2	313·1
N. 341°·22	118·2	182·0	140·9* (penumbral)	99·8	58·7	69·4	28·3	−352·3	−311·2	−270·1	N	−229·0	−239·7	198·6	157·5	116·4	75·3	34·2	−358·3	3·8	−327·9
N. 187°·66	265·9	329·6	288·5	217·4*	206·3	217·0*	175·9	134·7*	93·6	52·5	N	11·4*	22·1	346·2*	305·1	264·0*	222·9*	181·6*	140·7	151·4	110·3
F. 172°·58	−280·6	−344·4	−303·3	−262·2	−221·1	−231·8	190·7	149·5	108·4	67·3	F	26·2	36·9	−361·0	−319·9	−278·8	−237·7	196·6	155·5	166·2	125·1*
	A.D. 48	**1086**	**1144**	**1202**	**1260**	**1278**	**1335**	**1393**	**1451**	**1509**		**1567**	**1585**	**1643**	**·1701**	**1759**	**1817**		**1932**	**1950**	**2008**
N. 2°·84	77·8*	141·6*	100·5	59·4*	13·3*	29·0	−353·1	311·9*	270·8*	229·7*	N	188·6	199·3	158·2*	117·1*	76·0	34·9*	−359·0*	317·9	328·6	267·5*
F. 348°·51	92·6	156·3	115·2	74·1	33·0	43·7	2·6	−325·6	−285·5	−244·4	F	203·3	214·0	172·9	131·8	90·7	49·6	8·5	−332·6	−343·3	−302·2
F. 195°·15	240·2	304·0	262·9	221·3	180·7	191·4	150·3	109·1	68·0	26·9	F	−351·0	−361·7	320·6	279·5	238·4	197·3	156·2	115·1	125·8	84·7
N. 179°·82	−255·0	−318·8*	−277·7*	−236·6*	195·5*	−206·2	165·1*	123·9	82·8	41·7*	N	0·6	11·3	−335·4	−294·3*	−253·2	−212·1*	171·0*	129·9*	140·8	99·5*
	49 A.D.	**1087**	**1145**	**1203**		**1279**	**1336**	**1394**	**1452**	**1510**		**1568**	**1586**	**1644**	**1702**	**1760**	**1818**	**1875**	**1933**	**1951**	**2009**
F. 11°·13	52·1	115·9	74·8	33·7	−357·8	3·3	327·4	286·2	245·1	204·0	F.	162·9	173·6	132·5	91·4	50·3	9·2	338·3	292·2	302·9	261·8
N. 355°·80	66·9*	136·7*	89·6*	48·5	7·4*	18·1	−342·2*	−301·0	−259·9*	−218·8	N	177·7*	188·4	147·3*	106·2	65·1*	24·0*	−348·1	−307·0*	−317·7*	−276·6*
F. 187°·11	229·3	293·1	252·0	210·9	169·8	180·5	139·4	98·2	57·1	16·0	F.	340·1	−350·8	309·7	268·6	227·5	186·4	145·3	104·2	114·9	73·8
N. 171°·77	−244·1*	−307·9	−266·8	−225·7	184·6*	195·3	154·2	113·0	71·9*	30·8	N	−354·9	0·4	−324·5	−283·4*	−242·3	201·2	160·1	119·0	129·7	88·6
	A.D. 50	**1088**	**1146**	**1204**	**1261**		**1337**	**1395**	**1453**	**1511**		**1569**	**1587**	**1645**	**1703**	**1761**		**1876**	**1934**	**1952**	**2010**
N. 16°·42	26·5	90·2	49·1	8·0	332·1	342·8	301·7	260·5	219·4	178·3	N	137·2	147·9	106·8	65·7	24·6	348·7	307·6	266·5	277·2	236·1
F. 2°·06	41·2	105·0	63·9	22·8	346·9	−357·6	316·5	275·3	234·2	193·1	F.	152·0	162·7	121·6	80·5	39·4	−363·5	322·4	281·3	292·0	250·9
N. 347°·75	56·0	119·7	78·6*	37·5	−361·6	7·1*	−331·2	−290·0	−248·9	207·8	N	166·7	177·4*	136·3*	95·2	54·1*	18·0	−337·1*	−296·0	−306·8	−265·7
N. 194°·40	203·7	267·4	226·3	185·2	144·1*	154·8	113·7	72·5	31·4*	−355·5	N	314·4*	325·1	284·0	242·9	201·8	160·7*	119·6	78·5	89·2	48·1
F. 179°·06	218·4	282·2	241·1	200·0	158·9	169·6	128·5	87·3	46·2	5·1	F	329·2	339·9	298·8	257·7	216·6	175·5	134·4	93·3	104·0	62·9
N. 163°·73	−233·2	−296·9	−255·8	214·7	173·6	184·3	143·2	102·0	60·9	19·8	N	−343·9	−354·6	−313·5	−272·4	−231·3	190·2	149·1	108·0	118·7	77·6
	A.D. 51	**1089**	**1147**		**1262**	**1280**	**1338**	**1396**	**1454**	**1512**		**1570**	**1588**	**1646**	**1704**	**1762**	**1819**	**1877**	**1935**	**1953**	**2011**
N. 10°·37	15·6	79·4*	38·3	−362·4*	321·3	332·0*	290·9	249·7	208·6	167·5	N	126·4	137·1	96·0	54·9	13·8*	337·9	296·8	255·7	256·4	215·3
F. 355°·04	30·4	94·1	53·0	11·9	−336·0	−346·7	−305·6	−264·4	−223·3	182·2	F	141·1	151·8	110·7	69·6	28·5	−352·6	−311·5	−270·4	−281·1	−240·0
N. 186°·35	192·8	256·5	215·4*	174·3	133·2	143·9	102·8*	61·6*	20·5*	344·6*	N.	303·5	314·2*	273·1	232·0*	190·9*	149·8	108·7	67·6*	78·3*	37·2
F. 171°·02	−207·5	−271·3	−230·2	189·1	148·0	158·7	117·6	76·4	35·3	−359·4	F.	−318·3	−329·0	−287·9	−246·8	−205·7	164·6	123·5	82·4	93·1	52·0
	A.D. 52	**1090**	**1148**	**1205**	**1263**	**1281**	**1339**	**1397**	**1455**	**1513**		**1571**	**1589**	**1647**	**1705**	**1763**	**1820**	**1878**	**1936**	**1954**	**2012**
N. 2°·33	4·7*	68·5	27·4*	−351·5*	310·4	321·1*	280·0*	238·8	197·7	156·6	N	115·5*	126·2*	85·1*	44·0	2·9*	327·0*	285·9*	244·8	255·5	214·4
F. 346°·99	19·5	83·2	42·1	1·0	−325·1	−335·8	−294·7	−253·5	212·4	171·3	F.	130·2	140·9	99·8	58·7	17·6	−341·7	−300·6	−259·5	−270·2	−299·1
F. 193°·64	167·1	230·9	189·8	**1206** 148·7	**1264** 107·6	**1282** 118·3	**1340** 77·2	**1398** 36·0	−360·1	319·0	F.	277·9	288·6	247·5	206·4	165·3	**1821** 124·2	**1879** 83·1	**1937** 42·0	**1955** 52·7	**2013** 11·6
N. 178°·30	181·9	−215·7*	−204·6	163·5*	122·4	133·1*	92·0	50·8	9·7*	−333·8	N	−292·7*	−303·4	−262·3*	−221·2	180·1*	139·0	97·9*	56·8	67·5*	26·4
F. 9°·61	344·3	42·9	1·8	326·0	284·9	295·6	254·5	213·3	172·2	131·1	F	90·0	100·7	59·6	18·5	342·6	301·5	260·4	219·3	230·0	188·9
N. 354°·28	−359·1*	57·7*	16·6	−340·8*	−299·7*	−310·4*	−269·3	−228·1*	187·0	145·9*	N.	104·8*	115·5*	74·4*	33·3*	−357·4*	−316·3	−275·2	−234·1	−244·8*	−203·7
	A.D. 53	**1091**	**1149**	**1207**	**1265**	**1283**	**1341**	**1399**	**1456**	**1514**		**1572**	**1590**	**1648**	**1706**	**1764**	**1822**	**1880**	**1938**	**1956**	**2014**
F. 185°·59	156·2	220·0	178·9	137·8	96·7	107·4	66·3	25·1	349·2	308·1	F	267·0	277·7	236·6	195·5	154·4	113·3	72·2	31·1	41·8	0·7
N. 170°·26	171·0*	−234·8	193·7	152·6*	111·5	122·2	81·1	39·9	−364·0	−322·9	N	−281·8	−292·5	−251·4	210·3	169·2	128·1	87·0	45·9	56·6	15·5
N. 16°·91	318·7	17·2	341·3	300·2	259·1	269·8	228·7	187·5	146·4	105·3	N.	64·2	74·9	33·8	−357·9	316·8	275·7	234·6	193·5	204·2	163·1
F. 1°·57	333·4	32·0	−356·1	315·0	273·9	284·6	243·5	202·3	161·2	120·1	F.	79·0	89·7	48·6	7·5	331·6	290·5	249·4	208·3	219·0	177·9
N. 346°·24	−348·1	46·7	5·6	−329·7	−288·6*	−299·3	−258·2*	217·0	175·9	134·8	N.	93·7	104·4	63·3	22·2*	−346·3	−305·2*	−264·1	−223·0	−233·7	192·6

TABLE IV-L—*cont*

Cycles of recurrence of Eclipses—Solar and Lunar—*cont*

			Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys		Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys
		0	**57** 324·1	**115** 283·0	**173** 241·9	**191** 252·6	**249** 211·5	**307** 170·4	**365** 129·3	**423** 88·2	**481** 47·1		**539** 6·0	**557** 16·7	**614** 340·8	**672** 299·7	**730** 258·6	**788** 217·5	**846** 174·6	**864** 187·1	**922** 146·0	**980** 104·9
	Cyclic variation; add algebraically to fig. in col. 2.		– ·08	– 17	– ·25	+ ·22	+ ·14	+ ·05	– ·03	– 12	– 20		– 29	+ 18	+ 10	+ 01	– 07	– 16	– 24	+ 23	+ ·15	+ ·06
			Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys		Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys	Yrs Dys
	Sun from node.	Successive differences	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1		+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+58 −41·1	+18 +10·7	+58 −41·1	+58 −41·1
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
		A.D. 54	**112**	**170**	**228**	**246**		**361**	**419**	**477**	**535**		**593**	**611**	**669**	**727**	**785**		**900**	**918**	**976**	**1034**
N.	192°·88	130·6	89·4	48·3	7·2	17·9	342·0*	309·9	259·8*	218·7	177·6*	N	136·5	147·2	106·1	65·0*	23·9	348·0*	306·9	317·6	276·5	235·4
F.	177°·55	145·3	104·2	63·1	22·0	32·7	−356·8	315·7	274·6	233·5	192·4	F.	151·3	162·0	120·9	79·8	38·7	−362·8	321·7	332·4	291·3	250·2
N.	162°·21	160·1 (penumbral)	118·9	77·8	36·7	47·4	6·3	−330·4	−289·3	−248·2	207·1	N	166·0	176·7	135·6	94·5	53·4	18·3	−336·4*	−347·1	−306·0	−264·9
N.	8°·86	307·8	266·6	225·5	184·4	195·1	154·0	112·9	71·8	30·7	−354·8	N	313·7*	324·4	283·3	242·2	201·1	160·0*	118·9	129·6	88·5	47·4*
F.	353°·52	−322·5	−281·4	−240·3	199·2	−209·9	168·8	127·7	86·6	45·5	4·4	F.	−3.8 5	−339·2	−298·1	−257·0	−215·9	174·8	133·7	144·4	103·3	62·2
		A.D. 55	**113**	**171**		**247**	**304**	**362**	**420**	**478**	**536**		**594**	**612**	**670**	**728**	**786**	**843**	**901**	**919**	**977**	**1035**
N	184°·84	119·7*	78·5	37·4	−361·5	7·0*	331·1	290·0*	248·9	207·8	166·7	N	125·6*	136·3	95·2*	54·1	13·0*	337·1*	296·0	306·7*	265·6*	224·5
F.	169°·50	134·5	93·3	52·2	11·1	21·8	−345·9	−304·8	−263·7	−222·6	181·5	F	140·4	151·1	110·0	68·9	27·8	−351·9	−310·8	−321·5	−280·4	−239·3
N.	0°·81	296·9	255·7*	214·6	173·5*	184·2	143·1*	102·0	60·9	19·8*	343·9	N	302·8*	313·5	272·4*	231·3*	190·2*	149·1	108·0*	118·7*	77·6*	36·5*
F.	345°·48	−311·6	−270·5	−229·4	188·3	199·0	157·9	116·8	75·7	34·6	−358·7	F.	−317·6	−328·3	−287·2	−246·1	−205·0	163·9	122·8	133·5	92·4	51·3
		A.D. 56	**114**	**172**	**229**		**305**	**363**	**421**	**479**	**537**		**595**	**613**	**671**	**729**	**787**	**844**	**902**	**920**	**978**	**1036**
F.	192°·13	194·0	52·9	11·8	335·9	346·6	305·5	264·4	223·3	182·2	141·1	F	100·0	110·7	69·6	28·5	−352·7	311·5	270·4	281·1	240·0	198·9
N.	176°·79	108·8	67·6*	26·5	−350·6	−361·3	−320·2*	−279·1	−238·0*	197·9*	155·8	N	114·7	125·4*	84·3	43·2	2·1*	−326·2*	−285·1	−295·8*	−254·8*	−213·6*
F.	8°·10	271·2	230·1	189·0	147·9	158·6	117·5	76·4	35·3	−359·4	318·3	F.	277·2	287·9	246·8	205·7	164·6	123·5	82·4	93·1	52·0	10·9
N.	352°·77	−286·0*	−244·8*	203·7*	162·6	173·3	132·2*	91·1*	50·0	8·9	−333·0*	N	−291·9	−302·6	−261·5*	−2.0 4*	179·3*	138·2*	97·1	107·8*	66·7	25·6
		A.D. 57	**115**		**230**	**248**	**306**	**364**	**422**	**480**	**538**		**596**	**614**	**672**	**730**		**845**	**903**	**921**	**979**	**1037**
N.	199°·42	68·4	27·2	−351·3	310·2	320·9	279·8	238·7	197·6	156·5	115·4	N	74·3	85·0	43·9	2·8	326·9	285·8	244·7	255·4	214·3	173·2
F.	184°·08	83·1	41·9	0·8	324·9	335·6	294·5	253·4	212·3	171·2	130·1	F	89·0	99·7	58·6	17·5	341·6	300·5	259·4	270·1	229·0	187·9
N	168°·74	97·9	56·7	15·6	−339·7	−350·4	−309·3	−268·2	−227·1	186·0*	144·9	N	103·8	114·5	73·4*	32·3	−356·4	−315·3	−274·2	−284·9	−243·8	202·7
N.	15°·39	245·5	204·4	163·3	122·2	132·9	91·8	50·7	9·6	333·7	292·6	N	251·5	262·2	221·1	180·0	138·9	97·8	56·7	67·4	26·3	−350·4
F.	0°·06	260·3	219·2	178·1	137·0	147·7	106·6	65·5	24·4	348·5	307·4	F.	266·3	277·0	235·9	194·8	153·7	112·6	71·5	82·2	41·1	0·0
N.	344°·7	−275·1	−233·9	192·8	151·7	162·4	121·3	80·2*	39·1	−363·2	−322·1	N	−281·0*	−291·7	−250·6*	209·5	168·4	126·3	86·2	96·9	55·8*	14·7
		A.D. 58	**116**	**173**	**231**	**249**	**307**	**365**	**423**	**481**	**539**		**597**	**615**	**673**		**788**	**846**	**904**	**922**	**980**	**1038**
N	191°·37	57·5	16·3	340·4	299·3	310·0	268·9	227·8	186·7	145·6*	104·5	N	63·4	74·1	33·0	−357·1	316·0*	274·9*	233·8*	244·5	203·4	162·3
F.	176°·03	72·2	31·1	−355·2	314·1	324·8	283·7	242·6	201·5	160·4	119·3	F.	78·2	88·9	47·8	6·7	330·8	289·7	248·6	259·3	218·2	177·1
N.	160°·70	87·0	45·8	4·7	−328·8	−339·5	−298·4	−257·3	216·2	175·1	134·0	N	92·9	103·6	62·5	21·4	−345·5	−304·4	−263·3	−274·0	−232·9	191·8
				174	**232**	**250**	**308**	**366**	**424**							**731**	**789**	**847**	**905**	**923**	**981**	
N.	7°·35	234·7	193·5	152·4	111·3	122·0	80·9	39·8	−363·9	322·8	281·7*	N	240·6	251·3	210·2	169·1	128·0	86·9	45·8*	56·5	15·4*	339·5
F.	352°·01	249·4	208·3	167·2	126·1	136·8	95·7	54·6	13·5	−337·6	296·5	F.	255·4	267·1	225·0	183·9	142·8	101·7	60·6	71·3	30·2	354·2

TABLE IV-L—*cont.*

Cycles of recurrence of Eclipses—Solar and Lunar—*cont.*

		0	Yrs. Dys. 1038 68·8	Yrs. Dys. 1096 22·7	Yrs. Dys. 1153 346·8	Yrs. Dys. 1211 305·7	Yrs. Dys. 1229 316·4	Yrs. Dys. 1287 275·8	Yrs. Dys. 1345 234·1	Yrs. Dys. 1403 198·1	Yrs. Dys. 1461 152·0		Yrs. Dys. 1519 110·9	Yrs. Dys. 1537 121·6	Yrs. Dys. 1595 80·5	Yrs. Dys. 1653 39·4	Yrs. Dys. 1710 363·6	Yrs. Dys. 1768 322·4	Yrs. Dys. 1826 281·8	Yrs. Dys. 1884 240·2	Yrs. Dys. 1902 250·9	Yrs. Dys. 1960 209·8
		Cyclic variation, add algebraically to fig. in col. 2.	−·02	−·11	−19	−28	+19	+11	+02	−16	−15		−23	+24	+16	+07	+00	−08	−17	+·25	+22	+·14
Sun from node.		Successive differences.	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +10·7	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1		Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +10·7	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +58 −41·1	Yrs. Dys. +18 +10·7	Yrs. Dys. +58 −41·1
			(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)		(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
		A.D. 54	**1092**	**1150**	**1208**	**1266**	**1284**	**1342**		**1457**	**1515**		**1573**	**1591**	**1649**	**1707**	**1765**	**1823**	**1881**	**1939**	**1957**	
N.	192°·88	130·6	*194·3*	153·2	112·1	71·0	81·7*	40·6*	−364·6*	*323·5*	282·4*	N.	241·3	252·0	210·9	*169·8*	128·7	87·6	46·5*	5·4	16·1*	*340·2*
F.	177°·55	145·3	209·1	168·0	126·9	65·8	98·5	55·4	14·2	338·3	297·2	F	256·1	266·8	225·7	184·6	143·5	102·4	61·3	20·2	30·9	−355·0
N.	162°·21	*160·1* (penumbral)	*−223·8*	*182·7*	*141·6*	*100·5*	*111·2*	*70·1*	*28·9*	*−353·0*	*−311·9*	N	*−270·8*	*−281·5*	*−240·4*	*199·3*	*158·2*	*117·1*	*76·0*	*34·9*	*45·6*	*4·5*
N.	8°·86	*307·8*	*6·3*	330·4*	*289·3*	*248·2*	*258·9*	*217·8*	*176·6*	*135·5*	*94·4*	N	*53·3*	*64·0*	*22·9*	347·0*	305·9*	*264·8*	*223·7*	*182·6*	193·8	*152·2*
F.	353°·52	−322·5	21·1	−345·2	−304·1	−263·0	273·7	−232·6	191·4	150·3	109·2	F.	68·1	78·8	37·7	*−361·8*	−320·7	−279·6	−238·5	137·4	−208·1	167·0
		A.D. 55	**1093**	**1151**	**1209**	**1267**	**1285**	**1343**	**1400**	**1458**	**1516**		**1574**	**1592**	**1650**	**1708**	**1766**	**1824**	**1882**		**1958**	**2015**
N.	184°·84	119·7*	183·4*	142·3	101·2	60·1*	70·8	29·7*	−353·7*	312·6*	271·5	N.	230·4	241·1	200·0*	158·9*	117·8	76·7*	35·6*	*−359·7*	5·2*	329·3*
F.	169°·50	134·5	198·2	157·1	116·0	74·9	85·6	*44·5*	3·3	*−327·4*	*−286·3*	F.	−245·2	−255·9	−214·8	173·7	132·6	91·5	*50·4*	*9·3*	20·0	*−344·1*
N.	0°·81	*296·9*	−360·6*	319·5*	278·4	*237·3*	248·0*	206·9*	165·7*	124·6	83·5*	N	42·4*	53·1*	*12·0*	336·1*	295·0*	253·9*	212·8	171·7	*182·4*	141·3*
F.	345°·48	*−311·6*	*10·2*	*−334·3*	*−293·2*	*−252·1*	*−262·8*	−221·7	*180·5*	*139·4*	*98·3*	F.	*57·2*	*67·9*	*26·8*	*−350·9*	*−309·8*	*−268·7*	*−227·6*	*186·5*	*197·2*	*156·1*
		A.D. 56	**1094**	**1152**	**1210**	**1268**	**1286**	**1344**	**1401**	**1459**	**1517**		**1575**	**1593**	**1651**	**1709**	**1767**	**1825**	**1883**	**1940**		**2016**
F.	192°·18	*194·0*	*157·8*	*116·7*	75·6	34·5	*45·2*	4·0	328·0	287·0	245·9*	F.	*204·8*	215·5*	*174·4*	*133·3**	*92·2*	51·6	10·0	334·1	344·8	*304·7*
N.	176°·79	108·8	*172·5*	131·4	*90·3*	49·2	*59·9*	*18·8*	−342·8*	*−301·7*	−260·6	N.	*−219·5*	−230·2	*189·1*	140·0	*106·9*	65·8*	*24·7*	*−348·8*	*−359·5*	*−318·4*
F.	8°·10	271·2	335·0	293·9	252·8	211·7	222·4	181·3	140·1	99·0	57·9	F	16·8	27·5	−351·6	310·5	269·4	228·3	187·2	146·1	156·8	115·7
N.	352°·77	−286·0*	*−349·7*	−308·6*	−267·5	−226·4*	−237·1	196·0*	*154·8*	113·7*	72·6*	N.	31·5	42·2*	1·1*	−325·2	*−284·1*	*−243·0*	201·9	160·8*	171·5	130·4
		A.D. 57	**1095**	**1153**	**1211**	**1269**	**1287**		**1402**	**1460**	**1518**		**1576**	**1594**	**1652**	**1710**	**1768**	**1826**		**1941**	**1959**	**2017**
N.	199°·42	*68·4*	*132·1*	*91·0*	*49·9*	*8·8*	*19·5*	*343·6*	*302·4*	*261·3*	*220·2*	N	*179·1*	*189·8*	*148·7*	*107·6*	*66·5*	*25·4*	349·5	*308·4*	*319·1*	*278·0*
F.	184°·08	83·1	146·8	105·7	64·6	23·5	34·2	−358·3	317·1	276·0	234·9	F.	193·8	204·5	163·4	122·3	81·2	40·1	−364·2	323·1	333·8	292·7
N.	168°·74	*97·9*	*161·6*	120·5*	*79·4*	*38·3*	*49·0*	7·9	*−331·9*	*−290·8*	*−249·7*	N.	*208·6*	*−219·3*	*178·2*	*137·1*	96·0*	*54·9*	13·8	*−337·9*	*−348·6*	*−307·5*
N.	15°·89	*245·5*	*309·3*	*268·2*	*227·1*	*186·0*	*196·7*	*155·6*	*114·4*	*73·3*	*32·2*	N.	*−356·3*	*1·9*	*325·9*	*284·8*	*243·7*	*202·6*	161·5	*120·4*	*131·1*	*90·0*
F.	0°·06	260·8	324·1	283·0	241·9	200·8	211·5	170·4	129·2	88·1	47·0	F	5·9	16·6	340·7	299·6	258·5	217·4	176·3	135·2	145·9	104·8
N.	344°·7	*−275·1*	*−338·8*	*−297·7*	−256·6*	*215·5*	−226·2*	185·1*	143·9	102·8*	61·7	N.	*20·6*	*31·3*	*−355·4**	*−314·3*	−273·2*	−232·1	191·0	150·0	160·6	*119·5*
		A.D. 58	**1096**	**1154**	**1212**	(**1270** lower rows)	**1288**	**1345** (**1346** lower rows)	**1403** (**1404** lower rows)	**1461** (**1462** lower rows)	**1519** (**1520** lower rows)		**1577**	**1595** (**1596** lower rows)	**1653**	**1711**	**1769**	**1827**	**1884** (**1885** lower rows)	**1942** (**1943** lower rows)	**1960** (**1961** lower rows)	**2018** (**2019** lower rows)
N.	191°·87	57·5	121·2	80·1	39·0	−363·1*	8·6	332·7*	*291·5*	250·4*	209·3	N.	168·2	178·9*	*137·8*	96·7	55·6*	14·5*	*338·6*	297·5	308·2*	267·1
F.	176°·03	72·2	136·0	94·9	53·8	12·7	23·4	347·5	306·3	265·2	224·1	F.	183·0	193·7	152·6	111·5	70·4	29·3	−353·4	312·3	323·0	281·9
N.	160°·70	*87·0*	*150·7*	*109·6*	*68·5*	*27·4*	*38·1*	*−362·2*	*−321·0*	*−279·9*	*−238·8*	N.	*197·7*	*208·4*	*167·3*	*126·2*	*85·1*	*44·0*	2·9	−327·0	*−337·7*	*−296·6*
N.	7°·85	*234·7*	208·4*	*257·3*	*216·2*	*175·1*	*185·8*	144·7	*103·5*	62·4*	*21·3*	N.	345·4*	*−356·1*	315·0*	273·9*	*232·8*	*191·7*	*150·6*	*109·5*	120·2	*79·1*
F.	352°·01	249·4	313·2	272·1	231·0	189·9	200·6	159·5	118·3	77·2	36·1	F.	360·2	5·7	329·8	288·7	247·6	206·5	165·4	124·3	135·0	93·9

TABLE IV-M—EXPLANATORY NOTES

Showing for each century A.D. the days of English calendar months corresponding to days of the Indian Solar year.

This table will be found equally useful for Table IV-L and for Tables V-A and V-B.

2. It shows, within a day or two, the English equivalent of the reckoning by completed days of the Indian Solar year.

3. The heavy type figures running horizontally are the centuries A.D. The heavy type figures running vertically are days of the Indian Solar year. Only every fourth day of the Indian Solar year is shown in order to economize space.

4. The century beginning with A.D. 1600 is shown twice, once to indicate the reckoning in the United Kingdom where the new style was not adopted till A.D. 1752, and again to indicate the reckoning in continental countries which adopted the new style on 15th October A.D. 1582.

5. For odd years in a century use the figure given in the table for the nearest century year. Thus for 1 January A.D. 640, use the figure which corresponds to 1 January A.D. 700, *i.e.*, 286 days of the Indian Solar year. The year A.D. 600 does not appear in the table and A.D. 550 which appears there was not so near to A.D. 640 as A.D. 700 was.

TABLE IV-M.

Correspondence of English calendar and days of the Indian Solar year A.D. 0 to A.D. 2000.

Days of the Indian Solar year.	A.D 0	A.D. 100	A.D 200	A.D. 350	A.D. 450
0	Mr. 15	Mr. 16	Mr. 17	Mr. 18	Mr. 19
4	19	20	21	22	23
8	23	24	25	26	27
12	27	28	29	30	31
16	31	Ap. 1	Ap. 2	Ap. 3	Ap. 4
20	Ap. 4	5	6	7	8
24	8	9	10	11	12
28	12	13	14	15	16
32	16	17	18	19	20
36	20	21	22	23	24
40	24	25	26	27	28
44	28	29	30	My. 1	My. 2
48	My. 2	My. 3	My. 4	5	6
52	6	7	8	9	10
56	10	11	12	13	14
60	14	15	16	17	18
64	18	19	20	21	22
68	22	23	24	25	26
72	26	27	28	29	30
76	30	31	Je. 1	Je. 2	Je. 3
80	Je. 3	Je. 4	5	6	7
84	Je. 7	Je 8	Je. 9	Je. 10	Je. 11
88	11	12	13	14	15
92	15	16	17	18	19
96	19	20	21	22	23
100	23	24	25	26	27
104	27	28	29	30	Jl 1
108	Jl. 1	Jl. 2	Jl. 3	Jl. 4	5
112	5	6	7	8	9
116	9	10	11	12	13
120	13	14	15	16	17
124	17	18	19	20	21
128	21	22	23	24	25
132	25	26	27	28	29
136	29	30	31	Au. 1	Au. 2
140	Au. 2	Au 3	Au 4	5	6
144	6	7	8	9	10
148	10	11	12	13	14
152	14	15	16	17	18
156	18	19	20	21	22
160	22	23	24	25	26
164	26	27	28	29	30
168	30	31	S. 1	S. 2	S. 3
172	S. 3	S. 4	5	6	7
176	7	8	9	10	11

Days of the Indian Solar year.	A.D. 550	A D 700	A D. 800	A D. 900	A.D 1000
0	Mr. 20	Mr. 21	Mr. 22	Mr. 23	Mr. 24
4	24	25	26	27	28
8	28	29	30	31	Ap 1
12	Ap. 1	Ap. 2	Ap. 3	Ap. 4	Ap 5
16	5	6	7	8	9
20	9	10	11	12	13
24	13	14	15	16	17
28	17	18	19	20	21
32	21	22	23	24	25
36	25	26	27	28	29
40	29	30	My. 1	My 2	My. 3
44	My. 3	My. 4	5	6	7
48	7	8	9	10	11
52	11	12	13	14	15
56	15	16	17	18	19
60	19	20	21	22	23
64	23	24	25	26	27
68	27	28	29	30	31
72	31	Je. 1	Je 2	Je. 3	Je. 4
76	Je. 4	5	6	7	8
80	8	9	10	11	12
84	Je. 12	Je. 13	Je. 14	Je. 15	Je. 16
88	16	17	18	19	20
92	20	21	22	23	24
96	24	25	26	27	28
100	28	29	30	Jl. 1	Jl. 2
104	Jl 2	Jl. 3	Jl. 4	5	6
108	6	7	8	9	10
112	10	11	12	13	14
116	14	15	16	17	18
120	18	19	20	21	22
124	22	23	24	25	26
128	26	27	28	29	30
132	30	31	Au. 1	Au. 2	Au. 3
136	Au 3	Au. 4	5	6	7
140	7	8	9	10	11
144	11	12	13	14	15
148	15	16	17	18	19
152	19	20	21	22	23
156	23	24	25	26	27
160	27	28	29	30	31
164	31	S. 1	S 2	S. 3	S. 4
168	S. 4	5	6	7	8
172	8	9	10	11	12
176	12	13	14	15	16

Days of the Indian Solar year.	A D. 1150	A.D. 1250	A.D. 1350	A.D. 1500	A D 1600
0	Mr. 25	Mr. 26	Mr. 27	Mr. 28	Mr. 29
4	29	30	31	Ap. 1	Ap. 2
8	Ap. 2	Ap 3	Ap. 4	5	6
12	6	7	8	9	10
16	10	11	12	13	14
20	14	15	16	17	18
24	18	19	20	21	22
28	22	23	24	25	26
32	26	27	28	29	30
36	30	My. 1	My. 2	My. 3	My. 4
40	My. 4	5	6	7	8
44	8	9	10	11	12
48	12	13	14	15	16
52	16	17	18	19	20
56	20	21	22	23	24
60	24	25	26	27	28
64	28	29	30	31	Je 1
68	Je 1	Je. 2	Je. 3	Je. 4	5
72	5	6	7	8	9
76	9	10	11	12	13
80	13	14	15	16	17
84	Je. 17	Je. 18	Je 19	Je 20	Je. 21
88	21	22	23	24	25
92	25	26	27	28	29
96	29	30	Jl. 1	Jl 2	Jl. 3
100	Jl. 3	Jl. 4	5	6	7
104	7	8	9	10	11
108	11	12	13	14	15
112	15	16	17	18	19
116	19	20	21	22	23
120	23	24	25	26	27
124	27	28	29	30	31
128	31	Au 1	Au 2	Au 3	Au. 4
132	Au 4	5	6	7	8
136	8	9	10	11	12
140	12	13	14	15	16
144	16	17	18	19	20
148	20	21	22	23	24
152	24	25	26	27	28
156	28	29	30	31	S. 1
160	S. 1	S 2	S. 3	S 4	5
164	5	6	7	8	9
168	9	10	11	12	13
172	13	14	15	16	17
176	17	18	19	20	21

(New style countries) New style (European countries, exc. Russia).

Days of the Indian Solar year.	A.D 1600	A.D. 1750	A.D. 1775	A.D. 1800	A.D. 1850	A.D. 1900	A.D. 1950
0	Ap. 8	Ap. 9	Ap. 10	Ap. 11	Ap. 12	Ap 13	Ap. 14
4	12	13	14	15	16	17	18
8	16	17	18	19	20	21	22
12	20	21	22	23	24	25	26
16	24	25	26	27	28	29	30
20	28	29	30	My. 1	My. 2	My 3	My. 4
24	My. 2	My. 3	My. 4	5	6	7	8
28	6	7	8	9	10	11	12
32	10	11	12	13	14	15	16
36	14	15	16	17	18	19	20
40	18	19	20	21	22	23	24
44	22	23	24	25	26	27	28
48	26	27	28	29	30	31	Je. 1
52	30	31	Je. 1	Je. 2	Je. 3	Je 4	Je. 5
56	Je. 3	Je 4	5	6	7	8	9
60	7	8	9	10	11	12	13
64	11	12	13	14	15	16	17
68	15	16	17	18	19	20	21
72	19	20	21	22	23	24	25
76	23	24	25	26	27	28	29
80	27	28	29	30	Jl. 1	Jl. 2	Jl. 3
84	Jl 1	Jl 2	Jl. 3	Jl. 4	Jl. 5	Jl 6	Jl. 7
88	5	6	7	8	9	10	11
92	9	10	11	12	13	14	15
96	13	14	15	16	17	18	19
100	17	18	19	20	21	22	23
104	21	22	23	24	25	26	27
108	25	26	27	28	29	30	31
112	29	30	31	Au. 1	Au. 2	Au. 3	Au. 4
116	Au 2	Au. 3	Au. 4	5	6	7	8
120	6	7	8	9	10	11	12
124	10	11	12	13	14	15	16
128	14	15	16	17	18	19	20
132	18	19	20	21	22	23	24
136	22	23	24	25	26	27	28
140	26	27	28	29	30	31	S. 1
144	30	31	S 1	S. 2	S. 3	S. 4	S. 5
148	S. 3	S. 4	5	6	7	8	9
152	7	8	9	10	11	12	13
156	11	12	13	14	15	16	17
160	15	16	17	18	19	20	21
164	19	20	21	22	23	24	25
168	23	24	25	26	27	28	29
172	27	28	29	30	O. 1	O. 2	O. 3
176	O. 1	O. 2	O 3	O. 4	5	6	7

TABLE IV·M—*cont.*

Correspondence of English Calendar and days of the Indian Solar year A.D. 0 to A.D. 2000—*cont.*

(New style countries) New style (European countries, exc Russia).

Days of the Indian Solar year.	A.D. 0	A.D. 100	A.D. 200	A.D. 350	A.D. 450	Days of the Indian Solar year.	A.D. 550	A.D. 700	A.D. 800	A.D. 900	A.D. 1000	Days of the Indian Solar year	A.D. 1150	A.D. 1250	A.D. 1350	A.D. 1500	A.D. 1600	Days of the Indian Solar year	A.D. 1600	A.D. 1750	A.D. 1775	A.D. 1775	A.D. 1800	A.D. 1850	A.D. 1950
180	11	12	13	14	15	**180**	16	17	18	19	20	**180**	21	22	23	24	25	**180**	5	6	7	8	9	10	11
184	15	16	17	18	19	**184**	20	21	22	23	24	**184**	25	26	27	28	29	**184**	9	10	11	12	13	14	15
188	19	20	21	22	23	**188**	24	25	26	27	28	**188**	24	30	O. 1	O 2	O 3	**188**	13	14	15	16	17	18	19
192	23	24	25	26	27	**192**	28	29	30	O. 1	O. 2	**192**	O. 3	O. 4	5	6	7	**192**	17	18	19	20	21	22	23
196	27	28	29	30	O 1	**196**	O. 2	O. 3	O 4	5	6	**196**	7	8	9	10	11	**196**	21	22	23	24	25	26	27
200	O. 1	O. 2	O 3	O 4	5	**200**	6	7	8	9	10	**200**	11	12	13	14	15	**200**	25	26	27	28	29	30	31
	0	**100**	**200**	**350**	**450**		**550**	**700**	**800**	**900**	**1000**		**1150**	**1250**	**1350**	**1500**	**1600**		**1600**	**1750**	**1775**	**1800**	**1850**	**1900**	**1950**
204	5	6	7	8	9	**204**	10	11	12	13	14	**204**	15	16	17	18	19	**204**	29	30	31	N. 1	N. 2	N. 3	N. 4
208	9	10	11	12	13	**208**	14	15	16	17	18	**208**	19	20	21	22	23	**208**	N 2	N 3	N 4	5	6	7	8
212	13	14	15	16	17	**212**	18	19	20	21	22	**212**	23	24	25	26	27	**212**	N 6	7	8	9	10	11	12
216	17	18	19	20	21	**216**	22	23	24	25	26	**216**	27	28	29	30	31	**216**	N. 10	11	12	13	14	15	16
220	21	24	23	24	25	**220**	26	27	28	29	30	**220**	31	N 1	N 2	N. 3	N. 4	**220**	14	15	16	17	18	19	20
224	25	26	27	28	29	**224**	30	31	N 1	N 2	N 3	**224**	N 4	5	6	7	8	**224**	18	19	20	21	22	23	24
228	29	30	31	N 1	N. 2	**228**	N 3	N. 4	5	6	7	**228**	8	9	10	11	12	**228**	22	23	24	25	26	27	28
232	N 2	N. 3	N. 4	5	6	**232**	7	8	9	10	11	**232**	12	13	14	15	16	**232**	26	27	28	29	30	D. 1	D. 2
236	6	7	8	9	10	**236**	11	12	13	14	15	**236**	16	17	18	19	20	**236**	30	D 1	D. 2	D 3	D 4	5	6
240	10	11	12	13	14	**240**	15	16	17	18	19	**240**	20	21	22	23	24	**240**	D 4	5	6	7	8	9	10
		100	**200**	**350**	**450**		**550**	**700**	**800**	**900**	**1000**		**1150**	**1250**	**1350**	**1500**	**1600**		**1600**	**1750**	**1775**	**1800**	**1850**	**1900**	**1950**
244	14	15	16	17	18	**244**	19	20	21	22	23	**244**	24	25	26	27	28	**244**	D 8	D 9	D. 10	D. 11	D. 12	D 13	D. 14
248	18	19	20	21	22	**248**	23	24	25	26	27	**248**	28	29	30	D 1	D. 2	**248**	12	13	14	15	16	17	18
252	22	23	24	25	26	**252**	27	28	29	30	D. 1	**252**	D 2	D. 3	D. 4	5	6	**252**	16	17	18	19	20	21	22
256	26	27	28	29	30	**256**	D. 1	D 2	D 3	D 4	5	**256**	6	7	8	9	10	**256**	20	21	22	23	24	25	26
260	30	D. 1	D 2	D. 3	D 4	**260**	5	6	7	8	9	**260**	10	11	12	13	14	**260**	24	25	26	27	28	29	30
264	D. 4	5	6	7	8	**264**	9	10	11	12	13	**264**	14	15	16	17	18	**264**	28	29	30	31	Ja. 1	Ja. 2	Ja 3
268	8	9	10	11	12	**268**	13	14	15	16	17	**268**	18	19	20	21	22	**268**	Ja 1	Ja 2	Ja 3	Ja. 4	5	6	7
272	12	13	14	15	16	**272**	17	18	19	20	21	**272**	22	23	24	25	26	**272**	Ja. 5	6	7	8	9	10	11
276	16	17	18	19	20	**276**	21	22	23	24	25	**276**	26	27	28	29	30	**276**	Ja 9	10	11	12	13	14	15
280	20	21	22	23	24	**280**	25	26	27	28	29	**280**	30	31	Ja 1	Ja 2	Ja 3	**280**	13	14	15	16	17	18	19
		100	**200**	**350**	**450**		**550**	**700**	**800**	**900**	**1000**		**1150**	**1250**	**1350**	**1500**	**1600**		**1600**	**1750**	**1775**	**1800**	**1850**	**1900**	**1950**
284	24	25	26	27	28	**284**	29	30	31	Ja. 1	Ja 2	**284**	Ja 3	Ja. 4	5	6	7	**284**	17	18	19	20	21	22	23
288	28	29	30	31	Ja. 1	**288**	Ja. 2	Ja. 3	Ja. 4	5	6	**288**	7	8	9	10	11	**288**	21	22	23	24	25	26	27
292	Ja 1	Ja 2	Ja. 3	Ja. 4	5	**292**	6	7	8	9	10	**292**	11	12	13	14	15	**292**	25	26	27	28	29	30	31
296	5	6	7	8	9	**296**	10	11	12	13	14	**296**	15	16	17	18	19	**296**	29	30	31	F 1	F. 2	F. 3	F. 4
300	9	10	11	12	13	**300**	14	15	16	17	18	**300**	19	20	21	22	23	**300**	F. 2	F. 3	F 4	5	6	7	8
304	13	14	15	16	17	**304**	18	19	20	21	22	**304**	23	24	25	26	27	**304**	F 6	7	8	9	10	11	12
308	17	18	19	20	21	**308**	22	23	24	25	26	**308**	27	28	29	30	31	**308**	F 10	11	12	13	14	15	16
312	21	22	23	24	25	**312**	26	27	28	29	30	**312**	31	F 1	F 2	F 3	F. 4	**312**	14	15	16	17	18	19	20
316	25	26	27	28	29	**316**	30	31	F 1	F. 2	F 3	**316**	F 4	5	6	7	8	**316**	18	19	20	21	22	23	24
320	29	30	31	F 1	F 2	**320**	F 3	F 4	5	6	7	**320**	8	9	10	11	12	**320**	22	23	24	25	26	27	28
		100	**200**	**350**	**450**		**550**	**700**	**800**	**900**	**1000**		**1150**	**1250**	**1350**	**1500**	**1600**		**1600**	**1750**	**1775**	**1800**	**1850**	**1900**	**1950**
324	F. 2	F. 3	F. 4	F. 5	F. 6	**324**	7	8	9	10	11	**324**	12	13	14	15	16	**324**	26	27	28	Mr. 1	Mr. 2	Mr. 3	Mr. 4
328	6	7	8	9	10	**328**	11	12	13	14	15	**328**	16	17	18	19	20	**328**	Mr. 2	Mr. 3	Mr. 4	Mr. 5	6	7	8
332	10	11	12	13	14	**332**	15	16	17	18	19	**332**	20	21	22	23	24	**332**	6	7	8	9	10	11	12
336	14	15	16	17	18	**336**	19	20	21	22	23	**336**	24	25	26	27	28	**336**	10	11	12	13	14	15	16
340	18	19	20	21	22	**340**	23	24	25	26	27	**340**	28	Mr. 1	Mr. 2	Mr 3	Mr. 4	**340**	14	15	16	17	18	19	20
344	22	23	24	25	26	**344**	27	28	Mr. 1	Mr. 2	Mr 3	**344**	Mr 4	5	6	7	8	**344**	18	19	20	21	22	23	24
348	26	27	28	Mr. 1	Mr 2	**348**	Mr. 3	Mr. 4	5	6	7	**348**	8	9	10	11	12	**348**	22	23	24	25	26	27	28
352	Mr. 2	Mr. 3	Mr 4	5	6	**352**	7	8	9	10	11	**352**	12	13	14	15	16	**352**	26	27	28	29	30	31	Ap 1
356	6	7	8	9	10	**356**	11	12	13	14	15	**356**	16	17	18	19	20	**356**	30	31	Ap. 1	Ap. 2	Ap. 3	Ap. 4	Ap. 5
360	10	11	12	13	14	**360**	15	16	17	18	19	**360**	20	21	22	23	24	**360**	Ap. 3	Ap. 4	5	6	7	8	9
364	14	15	16	17	18	**364**	19	20	21	22	23	**364**	24	25	26	27	28	**364**	7	8	9	10	11	12	13

TABLE V-A—EXPLANATORY NOTE.

Tables V-A and V-B together constitute a Perpetual Planetary Almanac.

2. For illustrations of the use of Table V-A in conjunction with Table V-B see sections ii and iii, pages 98 to 125, Chapter V of this work.

3. The table is composed of two parts: columns 2, 3 and 4 give the increase of longitudes of the three major planets Mars, Jupiter and Saturn for 1, 2, 3, 4, 5 . . . up to 2,005 years. If the years are reckoned from 1 B.C., or A D. 0 the years 1, 2, 3, 4, . , etc., up to 2005 in column 1 will be years A.D. and they are so marked; but the years may be reckoned from any year A.D. or B.C. For instance in paragraph 294 of this work the years in column 1 are reckoned from 3102 B.C. and on page 119 they are reckoned from 1101 B.C.

4. The years in column 1 of Table V-A may be reckoned backwards from any year B.C. or A.D. in which case the quantities in columns 2 to 4 will become decreases of longitude for so many years reckoned backwards. For an example see page 103, paragraph 255. In practice, however, as noted in paragraph 257, page 103, much inconvenience will be avoided by reckoning the years in column 1 of Table V-A always forward, as is done in paragraph 294, pages 118 and 119.

5. Columns 5 to 9 and 11 to 15 of Table V-A give the years of the current cycle (Table V-B) when each of the five planets Mars, Mercury, Jupiter, Venus and Saturn attained the same positions on successive days of the Indian solar year as they did in any given year A.D. entered in column 1 or in any B.C. year entered in column 10. For examples see pages 103, 118, 119 of text.

6. In applying the current cycle (Table V-B) in any given case, care should be taken to see that the day of the Indian solar year is not varied, see remarks in paragraph 3 of the explanatory note to Table V-B. It is for this reason that in the model problem of Rama's horoscope, worked out on pages 118, 119 of this work, the day of the Indian solar year corresponding to Mesha śukla navami is first ascertained in every case and entered in column 1 of the investigation tables on those pages.

7. For very accurate work, allowance should be made for the cyclic variations tabled below. Thus if we wish to know the position of the planet Jupiter on the 89th complete day of A.D. 634 (see paragraph 276, page 112 of the text) and use Tables V-A and V-B for that purpose, we shall find that against A.D. 634. Table V-A refers us to A.D. 1844 for information regarding Jupiter's places. From Table V-B we find that Jupiter's place on the 89th complete day of A.D. 1844 (by taking proportional parts as directed in explanatory note to Table V-B, paragraph 5) was 340·9°. The cyclic variation for the interval between A.D. 634 and A.D. 1844 or 1,210 years being — 2 × ·197 or — ·394, we deduct ·4 from 340·9 and conclude that Jupiter's place on 89th complete day of A.D. 634 was 340·5°.

8. The most convenient years from which a start may be made in Indian planetary investigations are 3201 B.C., 3102 B.C., 2101 B.C., 1101 B.C., 101 B.C., 1 B.C., A.D. 1000 A.D. 1800, and the mean longitudes of Mars, Jupiter and Saturn for every ten complete days in these years are therefore given at page 361 below. Suppose we wish to search for a horoscope for 4000 years beginning with 0 Kaliyuga, we make a start with 3102 B.C., and search for 2,000 years with the help of Table V-A and then make a start again with 1101 B.C., and search for another 2,000 years with the help of Table V-A. This is the plan followed in searching for Rama's horoscope—vide section iii, Chapter V of the text of this work.

TABLE V-A—Cyclic Variations.

[N B.—The signs given below are for forward cycles. For cycles reckoned backwards, reverse the sign + or −.]

Period forward yrs.	Cyclic variation.	Analysis of period.	Analysis of cyclic variation.
		Mars.	
	Degrees.	Years.	Degrees.
1	+ 191 4052		
79	+ 1·015		
284	− ·908		
363	+ 107	284 + 79	+ 1·015 − ·908 = + ·107
2099	− ·37	6 × 363 − 79 = 2178 − 79	+ ·64 − 1·01 = − ·37
2462	− ·26	7 × 363 − 79 = 2541 − 79	+ ·75 − 1·01 = − ·266; or − ·27
3551	+ ·055	10 × 363 − 79 = 3630 − 79	+ 1 070 − 1·015 = + ·055
3914	+ ·162	3551 + 363; or 3630 + 284	+ ·055 + 107; or 1·070 − 908 = + ·162
4277	+ ·27	3914 + 363	+ ·162 + ·107 = + ·269 or + ·27
6739	+ ·008	4277 + 2462	+ ·27 − ·26 = + ·008
N.B. **726, 1089, 1452, 1815, 2178, 2541, 2904, 3267** years are multiples of 363.			
		Mercury.	
1	+ 54 7603		
46	− 1 0259		
263	+ 1 96		
309	+ 0·9344		
355	− ·09150		
2439	+ 3854	6 × 355 + 309	+ ·9844 − ·5490 = + ·3854
3859	+ ·0194	10 × 355 + 309	− ·9150 + ·9344 = ·0194
4214	− ·0721	12 × 355 − 46	− 1·0980 + 1·0259 = − ·0721
N B.—**710, 1065 1420, 1775, 2130, 2485, 2840, 3195, 3550, 3905, 4260** are multiples of 355.			
		Jupiter.	
1	+ 80·347		
12	+ 4 1682		
83	− 1 1630		
95	+ 3·0062	83 + 12 = 95	+ 4 1692 − 1 1630 = + 3 0062
178	+ 1 8431	95 + 83	+ 3·0062 − 1 1630 = 1·8432
261	+ 68009	178 + 83	+ 1 8431 − 1 1630 = 0 6801
344	− ·48294	261 + 83; or 4 × 83 + 12	+ 68009 − 1 16304 = − ·48295
605	+ 19714	344 + 261; or 7 × 83 + 24	+ ·68009 − 48294 = + ·19715
949	− ·28580	605 + 344	+ 19714 − ·48294 = − ·28580
N B.—**1210, 1815, 2420, 3025, 3630** years are multiples of 605 years.			
1554	− 08866	1210 + 344	+ ·39428 − ·48294 = − ·08866
1898	− 5716	1815 + 83, or 3 × 605 + 83	+ 5914 − 1·1630 = − 5716
2159	+ 1085	1898 + 261	− 5716 + ·6801 = + ·1085
2503	− ·2744	4 × 605 + 83	+ 78856 − 1 1630 = − 3744
2764	+ ·3056	4 × 605 + 344	+ ·78556 − ·48294 = + ·30562
3108	− 17732	2 × 1554	− 17732
3452	− ·66026	2 × 1554 + 344	− 17732 − ·48294 = 66026
3713	+ 01983	3452 + 261	− ·66026 + 68009 = + 01983
4057	− 46311	3713 + 344	+ ·01983 − ·48294 = ·46311
4318	+ ·21694	3 × 1554 − 344	− ·26600 + 48294 = + 21694
		Venus.	
1	225 189921		
8	+ 1 518648		
235	− ·3897		
470	− ·78	2 × ·235	2 × ·3897 = ·7794
478	+ ·74	2 × 235 + 8	− ·7794 + 1·5186 = + ·7392
713	+ ·3485	3 × 235 + 8	− 1·1691 + 1·5186 = + ·3485
948	− ·0402	4 × 235 + 8	− 1·5588 + 1·5186 = − ·0402
1418	− ·8196	6 × 235 + 8	− 2 3382 + 1·5186 = − ·8196
1426	+ ·6990	6 × 235 + 2 × 8	− 2·3382 + 3·0372 = + ·6990
1896	− ·0804	2 × 948	− ·0804
2131	− 4701	2 × 948 + 235	− ·0804 − ·3897 = − ·4701
2374	+ ·6588	2 × 948 + 478	− ·0804 + ·7392 = + ·6588
2844	− ·1206	3 × 948	− ·1206
3792	− 1608	4 × 948	− ·1608
4740	− ·2010	5 × 948	− ·2010
N B.—**1896, 2844, 3792, 4740, 5688** years are multiples of 948 years.			
		Saturn.	
1	12·2191001		
59	+ ·926906		
265	− 1·938474		
324	− 1·011568		
383	− ·084662		
Note.—**766, 1149, 1532, 1915, 2298, 2681, 3064, 3447, 3830, 4213** are multiples of 383.			
2357	+ 4187	6 × 383 + 59	− ·5082 + 9269 = + ·4187
2740	+ 3340	7 × 383 + 59	− ·5929 + ·9269 = + ·3340
3123	+ ·2493	8 × 383 + 59	− ·6776 + ·9269 = + ·2493
3506	+ ·1646	9 × 383 + 59	− ·7623 + ·9269 = + ·1646
3889	+ ·0808	10 × 383 + 59	− ·8466 + ·9269 = + ·0803
4272	− ·0048	11 × 383 + 59	− 9317 + ·9269 = − ·0048

TABLE V-A.—Auxiliary Table.

Mean longitude of Mars, Jupiter and Saturn for every ten complete days in each of eight selected years from 3201 B.C. to A.D. 1800, which are suitable as fixed years for Table V-A and for investigations under Chapter V, section ii of the Text, pp. 98 to 109.

Planet	Year	Days. 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
Mars	3201 B.C.	117·9	123·1	128·4	133·6	138·9	144·1	149·3	154·6	159·8	165·1	170·3	175·5	180·8	186·0	191·3	196·5	201·7	207·0	212·2
	3102 B.C.	347·0	352·2	357·5	2·7	7·9	13·2	18·4	23·7	29·0	34·1	39·4	44·6	49·9	55·1	60·3	65·6	70·8	76·1	81·3
	2101 B.C.	63·7	68·9	74·2	79·4	84·7	90·0	95·1	100·4	105·6	110·9	116·1	121·3	126·6	131·9	137·1	142·3	147·5	152·8	158·0
	1101 B.C.	308·9	314·1	319·4	324·6	329·9	335·1	340·3	345·6	350·8	356·1	1·3	6·5	11·8	17·0	22·3	27·5	32·7	38·0	43·2
	101 B.C.	194·2	199·4	204·7	209·9	215·2	220·4	225·6	230·9	236·1	241·4	246·6	251·8	257·1	262·3	267·6	272·8	278·0	283·3	288·5
	1 B.C.	254·7	259·9	265·2	270·4	275·7	280·9	286·1	291·4	296·6	301·9	307·1	312·3	317·6	322·8	328·1	333·3	338·5	343·8	349·0
	A.D. 1000	140·0	145·2	150·5	155·7	161·0	166·2	171·4	176·7	181·9	187·2	192·4	197·6	202·9	208·1	213·4	218·6	223·8	229·1	234·3
	A.D. 1800	264·2	269·4	274·7	279·9	285·2	290·4	295·6	300·9	306·1	311·4	316·6	321·8	327·1	332·3	337·6	342·8	348·0	353·3	358·9
Jupiter	3201 B.C.	251·3	252·1	253·0	253·8	254·6	255·5	256·3	257·1	257·9	258·8	259·6	260·4	261·3	262·1	262·9	263·8	264·6	265·4	266·3
	3102 B.C.	15·7	16·5	17·4	18·2	19·0	19·8	20·7	21·5	22·3	23·2	24·0	24·8	25·7	26·5	27·3	28·2	29·0	29·8	30·7
	2101 B.C.	153·5	154·3	155·2	156·0	156·8	157·6	158·5	159·3	160·1	161·0	161·8	162·6	163·5	164·3	165·1	166·0	166·8	167·6	168·5
	1101 B.C.	261·0	261·8	262·7	263·5	264·3	265·1	266·0	266·8	267·6	268·5	269·3	270·1	271·0	271·8	272·6	273·5	274·3	275·1	276·0
	101 B.C.	8·4	9·2	10·1	10·9	11·7	12·5	13·4	14·2	15·0	15·9	16·7	17·5	18·4	19·2	20·0	20·9	21·7	22·5	23·3
	1 B.C.	163·2	164·0	164·9	165·7	166·5	167·3	168·2	169·0	169·8	170·7	171·5	172·3	173·2	174·1	174·8	175·7	176·5	177·3	178·2
	A.D. 1000	270·6	271·4	272·3	273·1	273·9	274·8	275·7	276·4	277·2	278·1	278·9	279·7	280·6	281·4	282·2	283·1	283·9	284·7	285·6
	A.D. 1800	68·6	69·4	70·3	71·1	71·9	72·7	73·6	74·4	75·2	76·1	76·9	77·7	78·6	79·4	80·2	81·1	81·9	82·7	83·5
Saturn	3201 B.C.	209·5	209·8	210·2	210·5	210·8	211·2	211·5	211·8	212·2	212·5	212·8	213·2	213·5	213·8	214·2	214·5	214·8	215·2	215·5
	3102 B.C.	339·2	339·5	339·9	340·2	340·5	340·9	341·2	341·5	341·9	342·2	342·5	342·9	343·2	343·5	343·9	344·2	344·5	344·9	345·2
	2101 B.C.	330·5	330·8	331·2	331·5	331·8	332·2	332·5	332·8	333·2	333·5	333·8	334·2	334·5	334·8	335·2	335·5	335·8	336·2	336·5
	1101 B.C.	309·6	309·9	310·3	310·6	310·9	311·3	311·6	311·9	312·3	312·6	312·9	313·3	313·6	313·9	314·3	314·6	314·9	315·3	315·6
	101 B.C.	288·6	288·9	289·3	289·6	289·9	290·3	290·6	290·9	291·3	291·6	291·9	292·3	292·6	292·9	293·3	293·6	293·9	294·3	294·6
	1 B.C.	70·5	70·8	71·2	71·5	71·8	72·2	72·5	72·8	73·2	73·5	73·8	74·2	74·5	74·8	75·2	75·5	75·8	76·2	76·5
	A.D. 1000	49·6	49·9	50·3	50·6	50·9	51·3	51·6	51·9	52·3	52·6	52·9	53·3	53·6	53·9	54·3	54·6	54·9	55·3	55·6
	A.D. 1800	104·9	105·2	105·6	105·9	106·2	106·6	106·9	107·2	107·6	107·9	108·2	108·6	108·9	109·2	109·6	109·9	110·2	110·6	110·9

Planet	Year	Days 190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360
Mars	3201 B.C.	217·5	222·7	228·0	233·2	238·4	243·7	249·0	254·1	259·4	264·7	269·9	275·1	280·3	285·6	290·8	296·1	301·3	306·5
	3102 B.C.	86·5	91·8	97·0	102·3	107·5	112·7	118·0	123·2	128·5	133·7	139·0	144·2	149·4	154·7	160·0	165·1	170·4	175·6
	2101 B.C.	163·3	168·5	173·7	179·0	184·2	189·5	194·7	199·9	205·2	210·4	215·7	220·9	226·1	231·4	236·6	241·9	247·1	252·3
	1101 B.C.	48·5	53·7	58·9	64·2	69·4	74·7	79·9	85·1	90·4	95·6	100·9	106·1	111·3	116·6	121·8	127·1	132·3	137·5
	101 B.C.	293·8	299·0	304·2	309·5	314·7	320·0	325·2	330·4	335·7	340·9	346·2	351·4	356·6	1·9	7·1	12·4	17·6	22·8
	1 B.C.	354·3	359·5	4·7	10·0	15·2	20·5	25·7	30·9	36·2	41·4	46·7	51·9	57·1	62·4	67·6	72·9	78·1	83·3
	A.D. 1000	239·6	244·8	250·0	255·3	260·5	265·8	271·0	276·2	281·5	286·7	292·0	297·2	302·4	307·7	312·9	318·2	323·4	328·6
	A.D. 1800	3·8	9·0	14·2	19·5	24·7	30·0	35·2	40·4	45·7	50·9	56·2	61·4	66·6	71·9	77·1	82·4	87·6	92·8
Jupiter	3201 B.C.	267·1	267·9	268·7	269·6	270·4	271·2	272·1	272·9	273·7	274·6	275·4	276·2	277·1	277·9	278·7	279·5	280·4	281·2
	3102 B.C.	31·5	32·3	33·1	34·0	34·8	35·6	36·5	37·3	38·1	39·0	39·8	40·6	41·5	42·3	43·1	43·9	44·8	45·6
	2101 B.C.	169·3	170·1	170·9	171·8	172·6	173·4	174·3	175·1	175·9	176·8	177·6	178·4	179·3	180·1	180·9	181·7	182·6	183·4
	1101 B.C.	276·8	277·6	278·8	279·3	280·1	280·9	281·8	282·6	283·4	284·3	285·1	285·9	286·8	287·6	288·4	289·2	290·1	290·9
	101 B.C.	24·2	25·0	25·8	26·7	27·5	28·3	29·2	30·0	30·8	31·7	32·5	33·3	34·2	35·0	35·8	36·6	37·5	38·3
	1 B.C.	179·0	179·8	180·6	181·5	182·3	183·1	184·0	184·8	185·6	186·5	187·3	188·1	189·0	189·8	190·6	191·4	192·3	193·1
	A.D. 1000	286·4	287·2	288·0	288·9	289·7	290·5	291·4	292·2	293·0	293·9	294·7	295·5	296·4	297·2	298·0	298·8	299·7	300·5
	A.D. 1800	84·4	85·2	86·0	86·9	87·7	88·5	89·4	90·2	91·0	91·9	92·7	93·5	94·4	95·2	96·0	96·8	97·7	98·5
Saturn	3201 B.C.	215·8	216·2	216·5	216·8	217·2	217·5	217·8	218·2	218·5	218·8	219·2	219·5	219·8	220·2	220·5	220·8	221·2	221·5
	3102 B.C.	345·5	345·9	346·2	346·5	346·9	347·2	347·5	347·9	348·2	348·5	348·9	349·2	349·5	349·9	350·2	350·5	350·9	351·2
	2101 B.C.	336·8	337·2	337·5	337·8	338·2	338·5	338·8	339·2	339·5	339·8	340·2	340·5	340·8	341·2	341·5	341·8	342·2	342·5
	1101 B.C.	315·9	316·3	316·6	316·9	317·3	317·6	317·9	318·3	318·6	318·9	319·3	319·6	319·9	320·3	320·6	320·9	321·3	321·6
	101 B.C.	294·9	295·3	295·6	295·9	296·3	296·6	296·9	297·3	297·6	297·9	298·3	298·6	298·9	299·3	299·6	299·9	300·3	300·6
	1 B.C.	76·8	77·2	77·5	77·8	78·2	78·5	78·8	79·2	79·5	79·8	80·2	80·5	80·8	81·2	81·5	81·8	82·2	82·5
	A.D. 1000	55·9	56·3	56·6	56·9	57·3	57·6	57·9	58·3	58·6	58·9	59·3	59·6	59·9	60·3	60·6	60·9	61·3	61·6
	A.D. 1800	111·2	111·6	111·9	112·2	112·6	112·9	113·2	113·6	113·9	114·2	114·6	114·9	115·2	115·6	115·9	116·2	116·6	116·9

TABLE V-A.

Yearly increase of mean longitude of Mars, Jupiter and Saturn for 2005 years, also actual geocentric place of each planet with reference to Table V-B.

Years, also year A.D. if reckoned from 1 B.C.	Mars.	Jup.	Sat.	Mars	Merc	Jup.	Venus	Sat	B.C.	Mars.	Merc.	Jup.	Venus.	Sat.
		Degrees.		A.D.	A.D.	A.D.	A.D.	A.D.		A.D.	A.D	A.D.	A.D.	A.D.
1	191	30	12	1816	1776	1816	1897	1916	**1**	1815	1775	1815	1896	1915
2	23	61	24	1817	1777	1817	1898	1917	**2**	1814	1774	1814	1895	1914
3	214	91	37	1818	1778	1818	1899	1918	**3**	1813	1773	1813	1894	1913
4	46	121	49	1819	1779	1819	1900	1919	**4**	1812	1772	1812	1893	1912
5	237	152	61	1820	1780	1820	1901	1920	**5**	1811	1771	1811	1892	1911
6	68	182	73	1821	1781	1821	1902	1921	**6**	1810	1770	1810	1891	1910
7	260	212	86	1822	1782	1822	1903	1922	**7**	1809	1769	1809	1890	1909
8	91	243	98	1823	1783	1823	1904	1923	**8**	1808	1768	1808	1889	1908
9	283	273	110	1824	1784	1824	1905	1924	**9**	1807	1767	1807	1888	1907
10	114	303	122	1825	1785	1825	1906	1925	**10**	1806	1766	1806	1887	1906
11	305	334	134	1826	1786	1826	1907	1926	**11**	1805	1765	1805	1886	1905
12	137	4	147	1827	1787	1827	1908	1927	**12**	1804	1764	1804	1885	1904
13	328	35	159	1828	1788	1828	1909	1928	**13**	1803	1763	1803	1884	1903
14	160	65	171	1829	1789	1829	1910	1929	**14**	1802	1762	1802	1883	1902
15	351	95	183	1830	1790	1830	1911	1930	**15**	1801	1761	1801	1882	1901
16	183	126	196	1831	1791	1831	1912	1931	**16**	1800	1760	1800	1881	1900
17	14	156	208	1832	1792	1832	1913	1932	**17**	1799	1759	1799	1880	1899
18	205	186	220	1833	1793	1833	1914	1933	**18**	1798	1758	1798	1879	1898
19	37	217	232	1834	1794	1834	1915	1934	**19**	1797	1757	1797	1878	1897
20	228	247	244	1835	1795	1835	1916	1935	**20**	1796	1756	1796	1877	1896
21	60	277	257	1836	1796	1836	1917	1936	**21**	1795	1755	1795	1876	1895
22	251	308	269	1837	1797	1837	1918	1937	**22**	1794	1754	1794	1875	1894
23	82	338	281	1838	1798	1838	1919	1938	**23**	1793	1753	1793	1874	1893
24	274	8	293	1839	1799	1839	1920	1939	**24**	1792	1752	1792	1873	1892
25	105	39	305	1840	1800	1840	1921	1940	**25**	1791	1751	1791	1872	1891
26	296	69	318	1841	1801	1841	1922	1941	**26**	1790	1750	1790	1871	1890
27	128	99	330	1842	1802	1842	1923	1942	**27**	1789	1749	1789	1870	1889
28	319	130	342	1843	1803	1843	1924	1943	**28**	1788	1748	1788	1869	1888
29	151	160	354	1844	1804	1844	1925	1944	**29**	1787	1747	1787	1868	1887
30	342	190	7	1845	1805	1845	1926	1945	**30**	1786	1746	1786	1867	1886
31	174	221	19	1846	1806	1846	1927	1946	**31**	1785	1745	1785	1866	1885
32	5	251	31	1847	1807	1847	1928	1947	**32**	1784	1744	1784	1865	1884
33	196	281	43	1848	1808	1848	1929	1948	**33**	1783	1743	1783	1864	1883
34	28	312	55	1849	1809	1849	1930	1949	**34**	1782	1742	1782	1863	1882
35	219	342	68	1850	1810	1850	1931	1950	**35**	1781	1741	1781	1862	1881
36	51	13	80	1851	1811	1851	1932	1951	**36**	1780	1740	1780	1861	1880
37	242	43	92	1852	1812	1852	1933	1952	**37**	1779	1739	1779	1860	1879
38	73	73	104	1853	1813	1853	1934	1953	**38**	1778	1738	1778	1859	1878
39	265	104	117	1854	1814	1854	1935	1954	**39**	1777	1737	1777	1858	1877
40	96	134	129	1855	1815	1855	1936	1955	**40**	1776	1736	1776	1857	1876
41	288	164	141	1856	1816	1856	1937	1956	**41**	1775	1735	1775	1856	1875
42	119	195	153	1857	1817	1857	1938	1957	**42**	1774	1734	1774	1855	1874
43	310	225	165	1858	1818	1858	1939	1958	**43**	1773	1733	1773	1854	1873
44	142	226	178	1859	1819	1859	1940	1959	**44**	1772	1732	1772	1853	1872
45	333	286	190	1860	1820	1860	1941	1960	**45**	1771	1731	1771	1852	1871
46	165	316	202	1861	1821	1861	1942	1961	**46**	1770	1730	1770	1851	1870
47	356	346	214	1862	1822	1862	1943	1962	**47**	1769	1729	1769	1850	1869
48	187	17	227	1863	1823	1863	1944	1963	**48**	1768	1728	1768	1849	1868
49	19	47	239	1864	1824	1864	1945	1964	**49**	1767	1727	1767	1848	1867
50	210	77	251	1865	1825	1865	1946	1965	**50**	1766	1726	1766	1847	1866
51	42	108	263	1866	1826	1866	1947	1966	**51**	1765	1725	1765	1846	1865
52	233	138	275	1867	1827	1867	1948	1967	**52**	1764	1724	1764	1845	1864
53	64	168	288	1868	1828	1868	1949	1968	**53**	1763	1723	1763	1844	1863
54	256	199	300	1869	1829	1869	1950	1969	**54**	1762	1722	1762	1843	1862
55	87	229	312	1870	1830	1870	1951	1970	**55**	1761	1721	1761	1842	1861
56	279	259	324	1871	1831	1871	1952	1971	**56**	1760	1720	1760	1841	1860
57	110	290	336	1872	1832	1872	1953	1972	**57**	1759	1719	1759	1840	1859
58	301	320	349	1873	1833	1873	1954	1973	**58**	1758	1718	1758	1839	1858
59	133	351	1	1874	1834	1874	1955	1974	**59**	1757	1717	1757	1838	1857
60	324	21	13	1875	1835	1875	1956	1975	**60**	1756	1716	1756	1837	1856
61	156	51	25	1876	1836	1876	1957	1976	**61**	1755	1715	1755	1836	1855
62	317	82	38	1877	1837	1877	1958	1977	**62**	1754	1714	1754	1835	1854
63	179	112	50	1878	1838	1878	1959	1978	**63**	1753	1713	1753	1834	1853
64	10	142	62	1879	1839	1879	1960	1979	**64**	1752	1712	1752	1833	1852
65	201	173	74	1880	1840	1880	1961	1980	**65**	1751	1711	1751	1832	1851
66	33	203	86	1881	1841	1881	1962	1981	**66**	1750	1710	1750	1831	1850
67	224	233	99	1882	1842	1882	1963	1982	**67**	1749	1709	1749	1830	1849
68	56	264	111	1883	1843	1883	1964	1983	**68**	1748	1708	1748	1829	1848
69	247	294	123	1884	1844	1884	1965	1984	**69**	1747	1707	1747	1828	1847
70	78	324	135	1885	1845	1885	1966	1985	**70**	1746	1706	1746	1827	1846
71	270	355	148	1886	1846	1886	1967	1986	**71**	1745	1705	1745	1826	1845
72	101	25	160	1887	1847	1887	1968	1987	**72**	1744	1704	1744	1825	1844
73	293	55	172	1888	1848	1888	1969	1988	**73**	1743	1703	1743	1824	1843
74	124	86	184	1889	1849	1889	1970	1989	**74**	1742	1702	1742	1823	1842
75	315	116	196	1890	1850	1890	1971	1990	**75**	1741	1701	1741	1822	1841
76	147	146	209	1891	1851	1891	1972	1991	**76**	1740	1700	1740	1821	1840
77	338	177	221	1892	1852	1892	1973	1992	**77**	1739	1699	1739	1820	1839
78	170	207	233	1893	1853	1893	1974	1993	**78**	1738	1698	1738	1819	1838
79	1	237	245	1894	1854	1894	1975	1994	**79**	1737	1697	1737	1818	1837
80	192	268	258	1895	1855	1895	1976	1995	**80**	1736	1696	1736	1817	1836

TABLE V-A.—*cont.*

Yearly increase of mean longitude, etc.—*cont.*

Years; also year A.D. if reckoned from 1 B.C.	Mars.	Jup. Degrees.	Sat.	Mars. A.D.	Merc. A.D.	Jup A.D.	Venus. A.D.	Sat. A.D.	B.C.	Mars. A.D.	Merc. A.D.	Jup. A.D.	Venus A.D.	Sat. A.D.
81	24	298	270	1896	1856	1896	1977	1996	**81**	1735	1695	1735	1816	1835
82	215	328	282	1897	1857	1897	1978	1997	**82**	1734	1694	1734	1815	1834
83	47	359	294	1898	1858	1898	1979	1998	**83**	1733	1693	1733	1814	1833
84	238	29	306	1899	1859	1899	1980	1999	**84**	1732	1692	1732	1813	1832
85	69	60	319	1900	1860	1900	1981	1617	**85**	1731	1691	1731	1812	1831
86	261	90	331	1901	1861	1901	1982	1618	**86**	1730	1690	1730	1811	1830
87	92	120	343	1902	1862	1902	1983	1619	**87**	1729	1689	1729	1810	1829
88	284	151	355	1903	1863	1903	1984	1620	**88**	1728	1688	1728	1809	1828
89	115	181	8	1904	1864	1904	1985	1621	**89**	1727	1687	1727	1808	1827
90	306	211	20	1905	1865	1905	1986	1622	**90**	1726	1686	1726	1807	1826
91	138	242	32	1906	1866	1906	1987	1623	**91**	1725	1685	1725	1806	1825
92	329	272	44	1907	1867	1907	1988	1624	**92**	1724	1684	1724	1805	1824
93	161	302	56	1908	1868	1908	1989	1625	**93**	1723	1683	1723	1804	1823
94	352	333	69	1909	1869	1909	1990	1626	**94**	1722	1682	1722	1803	1822
95	184	3	81	1910	1870	1910	1991	1627	**95**	1721	1681	1721	1802	1821
96	15	33	93	1911	1871	1911	1992	1628	**96**	1720	1680	1720	1801	1820
97	206	64	105	1912	1872	1912	1993	1629	**97**	1719	1679	1719	1800	1819
98	38	94	117	1913	1873	1913	1994	1630	**98**	1718	1678	1718	1799	1818
99	229	124	130	1914	1874	1914	1995	1631	**99**	1717	1677	1717	1798	1817
100	61	155	142	1915	1875	1915	1996	1632	**100**	1716	1676	1716	1797	1816
101	252	185	154	1916	1876	1916	1997	1633	**101**	1715	1675	1715	1796	1815
102	83	215	166	1917	1877	1917	1998	1634	**102**	1714	1674	1714	1795	1814
103	275	246	179	1918	1878	1918	1999	1635	**103**	1713	1673	1713	1794	1813
104	106	276	191	1919	1879	1919	1765	1636	**104**	1712	1672	1712	1793	1812
105	297	306	203	1920	1880	1920	1766	1637	**105**	1711	1671	1711	1792	1811
106	129	337	215	1921	1881	1921	1767	1638	**106**	1710	1670	1710	1791	1810
107	320	7	227	1922	1882	1922	1768	1639	**107**	1709	1669	1709	1790	1809
108	152	37	240	1923	1883	1923	1769	1640	**108**	1708	1668	1708	1789	1808
109	343	68	252	1924	1884	1924	1770	1641	**109**	1707	1667	1707	1788	1807
110	175	98	264	1925	1885	1925	1771	1642	**110**	1706	1666	1706	1787	1806
111	6	129	276	1926	1886	1926	1772	1643	**111**	1705	1665	1705	1786	1805
112	197	159	289	1927	1887	1927	1773	1644	**112**	1704	1664	1704	1785	1804
113	29	189	301	1928	1888	1928	1774	1645	**113**	1703	1663	1703	1784	1803
114	220	220	313	1929	1889	1929	1775	1646	**114**	1702	1662	1702	1783	1802
115	52	250	325	1930	1890	1930	1776	1647	**115**	1701	1661	1701	1782	1801
116	243	280	337	1931	1891	1931	1777	1648	**116**	1700	1660	1700	1781	1800
117	74	311	350	1932	1892	1932	1778	1649	**117**	1699	1659	1699	1780	1799
118	266	341	2	1933	1893	1933	1779	1650	**118**	1698	1658	1698	1779	1798
119	97	11	14	1934	1894	1934	1780	1651	**119**	1697	1657	1697	1778	1797
120	289	42	26	1935	1895	1935	1781	1652	**120**	1696	1656	1696	1777	1796
121	120	72	39	1936	1896	1936	1782	1653	**121**	1695	1655	1695	1776	1795
122	311	102	51	1937	1897	1937	1783	1654	**122**	1694	1654	1694	1775	1794
123	143	133	63	1938	1898	1938	1784	1655	**123**	1693	1653	1693	1774	1793
124	334	163	75	1939	1899	1939	1785	1656	**124**	1692	1652	1692	1773	1792
125	166	193	87	1940	1900	1940	1786	1657	**125**	1691	1651	1691	1772	1791
126	357	224	100	1941	1901	1941	1787	1658	**126**	1690	1650	1690	1771	1790
127	188	154	112	1942	1902	1942	1788	1659	**127**	1689	1649	1689	1770	1789
128	20	284	124	1943	1903	1943	1789	1660	**128**	1688	1648	1688	1769	1788
129	211	315	136	1944	1904	1944	1790	1661	**129**	1687	1647	1687	1768	1787
130	43	345	148	1945	1905	1945	1791	1662	**130**	1686	1646	1686	1767	1786
131	234	15	161	1946	1906	1946	1792	1663	**131**	1685	1645	1685	1766	1785
132	65	46	173	1947	1907	1947	1793	1664	**132**	1684	1999	1684	1765	1784
133	257	76	185	1948	1908	1948	1794	1665	**133**	1683	1998	1683	1999	1783
134	88	106	197	1949	1909	1949	1795	1666	**134**	1682	1997	1682	1998	1782
135	280	137	210	1950	1910	1950	1796	1667	**135**	1681	1996	1681	1997	1781
136	111	167	222	1951	1911	1951	1797	1668	**136**	1680	1995	1680	1996	1780
137	302	198	234	1952	1912	1952	1798	1669	**137**	1679	1994	1679	1995	1779
138	134	228	246	1953	1913	1953	1799	1670	**138**	1678	1993	1678	1994	1778
139	325	258	258	1954	1914	1954	1800	1671	**139**	1677	1992	1677	1993	1777
140	157	289	271	1955	1915	1955	1801	1672	**140**	1676	1991	1676	1992	1776
141	348	319	283	1956	1916	1956	1802	1673	**141**	1675	1990	1675	1991	1775
142	179	349	295	1957	1917	1957	1803	1674	**142**	1674	1989	1674	1990	1774
143	11	20	307	1958	1918	1958	1804	1675	**143**	1673	1988	1673	1989	1773
144	202	50	320	1959	1919	1959	1805	1676	**144**	1672	1987	1672	1988	1772
145	34	80	332	1960	1920	1960	1806	1677	**145**	1671	1986	1671	1987	1771
146	225	111	344	1961	1921	1961	1807	1678	**146**	1670	1985	1670	1986	1770
147	57	141	356	1962	1922	1962	1808	1679	**147**	1669	1984	1669	1985	1769
148	248	171	8	1963	1923	1963	1809	1680	**148**	1668	1983	1668	1984	1768
149	79	202	21	1964	1924	1964	1810	1681	**149**	1667	1982	1750	1983	1767
150	271	232	33	1965	1925	1965	1811	1682	**150**	1666	1981	1749	1982	1766
151	102	262	45	1966	1926	1966	1812	1683	**151**	1665	1980	1748	1981	1765
152	294	293	57	1967	1927	1967	1813	1684	**152**	1664	1979	1747	1980	1764
153	125	323	70	1968	1928	1968	1814	1685	**153**	1663	1978	1746	1979	1763
154	316	353	82	1969	1929	1969	1815	1686	**154**	1662	1977	1745	1978	1762
155	148	24	94	1970	1930	1970	1816	1687	**155**	1661	1976	1744	1977	1761
156	339	54	106	1971	1931	1971	1817	1688	**156**	1660	1975	1743	1976	1760
157	171	84	118	1972	1932	1972	1818	1689	**157**	1659	1974	1742	1975	1759
158	2	115	131	1973	1933	1973	1819	1690	**158**	1658	1973	1741	1974	1758
159	193	145	143	1974	1934	1974	1820	1691	**159**	1657	1972	1740	1973	1757
160	25	176	155	1975	1935	1975	1821	1692	**160**	1656	1971	1739	1972	1756

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont.*

Years, also year A.D. if reckoned from 1 B.C.	Mars.	Jup	Sat.	Mars	Merc.	Jup	Venus	Sat	B.C.	Mars.	Merc.	Jup.	Venus.	Sat
		Degrees		A.D.	A.D.	A.D.	A.D.	A.D.		A.D.	A.D.	A.D.	A.D.	A.D.
161	216	206	167	1976	1936	1976	1822	1693	**161**	1655	1970	1999	1971	1755
162	48	236	179	1977	1937	1977	1823	1694	**162**	1654	1969	1998	1970	1754
163	239	267	192	1978	1938	1978	1824	1695	**163**	1653	1968	1997	1969	1753
164	70	297	204	1979	1939	1979	1825	1696	**164**	1652	1967	1996	1968	1752
165	261	327	216	1980	1940	1980	1826	1697	**165**	1651	1966	1995	1967	1751
166	93	358	228	1981	1941	1981	1827	1698	**166**	1650	1965	1994	1966	1750
167	285	28	241	1982	1942	1982	1828	1699	**167**	1649	1964	1993	1965	1749
168	116	58	253	1983	1943	1983	1829	1700	**168**	1648	1963	1992	1964	1748
169	807	89	265	1984	1944	1984	1830	1701	**169**	1647	1962	1991	1963	1747
170	139	119	277	1985	1945	1985	1831	1702	**170**	1646	1961	1990	1962	1746
171	330	149	290	1986	1946	1986	1832	1703	**171**	1645	1960	1989	1961	1745
172	162	180	302	1987	1947	1987	1833	1704	**172**	1614	1959	1988	1960	1744
173	353	210	314	1988	1948	1988	1834	1705	**173**	1648	1958	1987	1959	1743
174	184	240	326	1989	1949	1989	1835	1706	**174**	1642	1957	1986	1958	1742
175	16	271	338	1990	1950	1990	1836	1707	**175**	1641	1956	1985	1957	1741
176	207	801	351	1991	1951	1991	1837	1708	**176**	1610	1955	1984	1956	1740
177	39	831	3	1992	1952	1992	1838	1709	**177**	1639	1954	1983	1955	1739
178	230	2	15	1993	1953	1993	1839	1710	**178**	1638	1953	1982	1954	1738
179	61	32	27	1994	1954	1994	1840	1711	**179**	1637	1952	1981	1953	1737
180	253	62	40	1995	1955	1995	1841	1712	**180**	1920	1951	1980	1952	1786
181	84	93	52	1996	1956	1996	1842	1713	**181**	1919	1950	1979	1951	1735
182	276	123	64	1997	1957	1997	1843	1714	**182**	1918	1949	1978	1950	1734
183	107	154	76	1998	1958	1998	1844	1715	**183**	1917	1948	1977	1949	1733
184	298	184	88	1999	1959	1999	1845	1716	**184**	1916	1947	1976	1948	1732
185	130	214	101	1637	1960	1739	1846	1717	**185**	1915	1916	1975	1947	1731
186	821	245	113	1638	1961	1740	1847	1718	**186**	1914	1945	1974	1946	1730
187	153	275	125	1639	1962	1741	1848	1719	**187**	1913	1944	1973	1945	1729
188	344	305	137	1640	1963	1742	1849	1720	**188**	1912	1943	1972	1944	1728
189	176	338	149	1641	1964	1743	1850	1721	**189**	1911	1942	1971	1943	1727
190	7	6	162	1642	1965	1744	1851	1722	**190**	1910	1941	1970	1942	1726
191	198	36	171	1643	1966	1745	1852	1723	**191**	1909	1940	1969	1941	1725
192	30	67	186	1644	1967	1746	1853	1724	**192**	1908	1939	1968	1940	1724
193	221	97	198	1645	1968	1747	1854	1725	**193**	1907	1938	1967	1939	1723
194	53	127	211	1646	1969	1748	1855	1726	**194**	1906	1937	1966	1938	1722
195	244	158	223	1647	1970	1749	1856	1727	**195**	1905	1936	1965	1937	1721
196	75	188	235	1648	1971	1750	1857	1728	**196**	1904	1935	1964	1936	1720
197	267	218	247	1649	1872	1751	1858	1729	**197**	1903	1934	1963	1935	1719
198	98	249	259	1650	1973	1752	1859	1730	**198**	1902	1933	1962	1934	1718
199	290	279	272	1651	1974	1753	1860	1731	**199**	1901	1932	1961	1933	1717
200	121	309	284	1652	1975	1754	1861	1732	**200**	1900	1931	1960	1932	1716
201	312	340	296	1653	1976	1755	1862	1733	**201**	1899	1930	1959	1931	1715
202	144	10	308	1654	1977	1756	1863	1734	**202**	1898	1929	1958	1930	1714
203	335	40	321	1655	1978	1757	1864	1735	**203**	1897	1928	1957	1929	1718
204	167	71	333	1656	1979	1758	1865	1736	**204**	1896	1927	1956	1928	1712
205	858	101	345	1657	1980	1759	1866	1737	**205**	1895	1926	1955	1927	1711
206	189	132	357	1658	1981	1760	1867	1738	**206**	1894	1925	1954	1926	1710
207	21	162	9	1659	1982	1761	1868	1739	**207**	1893	1921	1953	1925	1709
208	212	192	22	1660	1983	1762	1869	1740	**208**	1892	1923	1952	1924	1708
209	44	223	34	1661	1984	1763	1870	1741	**209**	1891	1922	1951	1923	1707
210	235	253	46	1662	1985	1764	1871	1742	**210**	1890	1921	1950	1922	1706
211	66	283	58	1663	1986	1765	1872	1743	**211**	1889	1920	1949	1921	1705
212	258	314	71	1664	1987	1766	1873	1744	**212**	1888	1919	1948	1920	1704
213	89	344	83	1665	1988	1767	1874	1745	**213**	1887	1918	1947	1919	1703
214	281	14	95	1666	1989	1768	1875	1716	**214**	1886	1917	1946	1918	1702
215	112	45	107	1667	1990	1769	1876	1747	**215**	1885	1916	1945	1917	1701
216	303	75	119	1668	1991	1770	1877	1748	**216**	1884	1915	1944	1916	1700
217	135	105	182	1669	1992	1771	1878	1749	**217**	1883	1914	1943	1915	1699
218	326	136	144	1670	1993	1772	1879	1750	**218**	1882	1913	1942	1914	1698
219	158	166	156	1671	1994	1773	1880	1751	**219**	1881	1912	1941	1913	1697
220	349	196	168	1672	1995	1774	1881	1752	**220**	1880	1911	1910	1912	1696
221	180	227	181	1673	1996	1775	1882	1753	**221**	1879	1910	1939	1911	1695
222	12	257	193	1674	1997	1776	1883	1754	**222**	1878	1909	1938	1910	1694
223	203	287	205	1675	1998	1777	1884	1755	**223**	1877	1908	1937	1909	1693
224	35	318	217	1676	1999	1778	1885	1756	**224**	1876	1907	1936	1908	1692
225	226	348	229	1677	1645	1779	1886	1757	**225**	1875	1906	1935	1907	1691
226	58	18	242	1678	1646	1780	1887	1758	**226**	1874	1905	1934	1906	1690
227	249	49	254	1679	1647	1781	1888	1759	**227**	1873	1904	1933	1905	1689
228	80	79	266	1680	1648	1782	1889	1760	**228**	1872	1903	1932	1904	1688
229	272	109	278	1681	1649	1783	1890	1761	**229**	1871	1902	1931	1903	1687
230	103	140	291	1682	1650	1784	1891	1762	**230**	1870	1901	1930	1902	1686
231	295	170	303	1683	1651	1785	1892	1763	**231**	1869	1900	1929	1901	1685
232	126	201	315	1684	1652	1786	1893	1764	**232**	1868	1899	1928	1900	1684
233	317	231	327	1685	1653	1787	1894	1765	**233**	1867	1898	1927	1899	1683
234	149	261	339	1686	1654	1788	1895	1766	**234**	1866	1897	1926	1898	1682
235	340	292	352	1687	1655	1789	1896	1767	**235**	1865	1896	1925	1897	1681
236	172	822	4	1688	1656	1790	1897	1768	**236**	1864	1895	1924	1896	1680
237	3	352	16	1689	1657	1791	1898	1769	**237**	1863	1894	1923	1895	1679
238	194	23	28	1690	1658	1792	1899	1770	**238**	1862	1893	1922	1894	1678
239	26	53	41	1691	1659	1793	1900	1771	**239**	1861	1892	1921	1893	1677
240	217	83	52	1692	1660	1794	1901	1772	**240**	1860	1891	1920	1892	1676

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont.*

Years; also year A.D. if reckoned from 1 B.C.	Mars	Jup.	Sat	Mars.	Merc.	Jup.	Venus	Sat.	B.C.	Mars.	Merc.	Jup	Venus.	Sat.
		Degrees		A D	A.D.	A.D.	A.D.	A.D.		A.D	A.D	A.D	A.D.	A.D.
241	49	114	65	1693	1661	1795	1902	1773	**241**	1859	1890	1919	1891	1675
242	240	144	77	1694	1662	1796	1903	1774	**242**	1858	1889	1918	1890	1674
243	71	174	89	1695	1663	1797	1904	1775	**243**	1857	1888	1917	1889	1673
244	262	205	102	1696	1664	1798	1905	1776	**244**	1856	1887	1916	1888	1672
245	94	235	114	1697	1665	1799	1906	1777	**245**	1855	1886	1915	1887	1671
246	286	265	126	1698	1666	1800	1907	1778	**246**	1854	1885	1914	1886	1670
247	117	296	138	1699	1667	1801	1908	1779	**247**	1853	1884	1913	1885	1669
248	308	326	150	1700	1668	1802	1909	1780	**248**	1852	1883	1912	1884	1668
249	140	356	163	1701	1669	1803	1910	178	**249**	1851	1882	1911	1883	1667
250	331	27	175	1702	1670	1804	1911	1782	**250**	1850	1881	1910	1882	1666
251	163	57	187	1703	1671	1805	1912	1783	**251**	1849	1880	1909	1881	1665
252	354	87	199	1704	1672	1806	1913	1784	**252**	1848	1879	1908	1880	1664
253	185	118	212	1705	1673	1807	1914	1785	**253**	1847	1878	1907	1879	1663
254	17	148	224	1706	1674	1808	1915	1786	**254**	1846	1877	1906	1878	1662
255	208	179	236	1707	1675	1809	1916	1787	**255**	1845	1876	1905	1877	1661
256	40	209	248	1708	1676	1810	1917	1788	**256**	1844	1875	1904	1876	1660
257	231	239	260	1709	1677	1811	1918	1789	**257**	1843	1874	1903	1875	1659
258	62	270	273	1710	1678	1812	1919	1790	**258**	1842	1873	1902	1874	1658
259	254	300	285	1711	1679	1813	1920	1791	**259**	1841	1872	1901	1873	1657
260	85	330	297	1712	1680	1814	1921	1792	**260**	1840	1871	1900	1872	1656
261	277	1	309	1713	1681	1815	1922	1793	**261**	1839	1870	1899	1871	1655
262	108	31	322	1714	1682	1816	1923	1794	**262**	1838	1869	1898	1870	1654
263	299	62	334	1715	1683	1817	1924	1795	**263**	1837	1868	1897	1869	1653
264	131	92	346	1716	1684	1818	1925	1796	**264**	1836	1867	1896	1868	1652
265	322	122	358	1717	1685	1819	1926	1797	**265**	1835	1866	1895	1867	1651
266	154	153	10	1718	1686	1820	1927	1798	**266**	1834	1865	1894	1866	1650
267	345	183	23	1719	1687	1821	1928	1799	**267**	1833	1864	1893	1865	1649
268	177	213	35	1720	1688	1822	1929	1800	**268**	1832	1863	1892	1864	1648
269	8	244	47	1721	1689	1823	1930	1801	**269**	1831	1862	1891	1863	1647
270	199	274	59	1722	1690	1824	1931	1802	**270**	1830	1861	1890	1862	1646
271	31	304	72	1723	1691	1825	1932	1803	**271**	1829	1860	1889	1861	1645
272	222	335	84	1724	1692	1826	1933	1804	**272**	1828	1859	1888	1860	1644
273	54	5	96	1725	1693	1827	1934	1805	**273**	1827	1858	1887	1859	1643
274	245	35	108	1726	1694	1828	1935	1806	**274**	1826	1857	1886	1858	1642
275	76	66	120	1727	1695	1829	1936	1807	**275**	1825	1856	1885	1857	1641
276	268	96	133	1728	1696	1830	1937	1808	**276**	1824	1855	1884	1856	1640
277	99	127	145	1729	1697	1831	1938	1809	**277**	1823	1854	1883	1855	1639
278	291	157	157	1730	1698	1832	1939	1810	**278**	1822	1853	1882	1854	1638
279	122	187	169	1731	1699	1833	1940	1811	**279**	1821	1852	1881	1853	1637
280	313	218	182	1732	1700	1834	1941	1812	**280**	1820	1851	1880	1852	1636
281	145	248	194	1733	1701	1835	1942	1813	**281**	1819	1850	1879	1851	1635
282	336	278	206	1734	1702	1836	1943	1814	**282**	1818	1849	1878	1850	1634
283	168	309	218	1735	1703	1837	1944	1815	**283**	1817	1848	1877	1849	1633
284	359	339	230	1736	1704	1838	1945	1816	**284**	1816	1847	1876	1848	1632
285	190	9	243	1737	1705	1839	1946	1817	**285**	1815	1846	1875	1847	1631
286	22	40	255	1738	1706	1840	1947	1818	**286**	1814	1845	1874	1846	1630
287	213	70	267	1739	1707	1841	1948	1819	**287**	1813	1844	1873	1845	1629
288	45	100	279	1740	1708	1842	1949	1820	**288**	1812	1843	1872	1844	1628
289	236	131	292	1741	1709	1843	1950	1821	**289**	1811	1842	1871	1843	1627
290	67	161	304	1742	1710	1844	1951	1822	**290**	1810	1841	1870	1842	1626
291	259	191	316	1743	1711	1845	1952	1823	**291**	1809	1840	1869	1841	1625
292	90	222	328	1744	1712	1846	1953	1824	**292**	1808	1839	1868	1840	1624
293	282	252	340	1745	1713	1847	1954	1825	**293**	1807	1838	1867	1839	1623
294	113	282	353	1746	1714	1848	1955	1826	**294**	1806	1837	1866	1838	1622
295	304	313	5	1747	1715	1849	1956	1827	**295**	1805	1836	1865	1837	1621
296	136	343	17	1748	1716	1850	1957	1828	**296**	1804	1835	1864	1836	1620
297	327	13	29	1749	1717	1851	1958	1829	**297**	1803	1834	1863	1835	1619
298	159	44	42	1750	1718	1852	1959	1830	**298**	1802	1833	1862	1834	1618
299	350	74	54	1751	1719	1853	1960	1831	**299**	1801	1832	1861	1833	1617
300	181	104	66	1752	1720	1854	1961	1832	**300**	1800	1831	1860	1832	1999
301	13	135	78	1753	1721	1855	1962	1833	**301**	1799	1830	1859	1831	1998
302	204	165	90	1754	1722	1856	1963	1834	**302**	1798	1829	1858	1830	1997
303	36	196	103	1755	1723	1857	1964	1835	**303**	1797	1828	1857	1829	1996
304	227	226	115	1756	1724	1858	1965	1836	**304**	1796	1827	1856	1828	1995
305	59	256	127	1757	1725	1859	1966	1837	**305**	1795	1826	1855	1827	1994
306	250	287	139	1758	1726	1860	1967	1838	**306**	1794	1825	1854	1826	1993
307	81	317	151	1759	1727	1861	1968	1839	**307**	1793	1824	1853	1825	1992
308	273	347	164	1760	1728	1862	1969	1840	**308**	1792	1823	1852	1824	1991
309	104	18	176	1761	1729	1863	1970	1841	**309**	1791	1822	1851	1823	1990
310	296	48	188	1762	1730	1864	1971	1842	**310**	1790	1821	1850	1822	1989
311	127	78	200	1763	1731	1865	1972	1843	**311**	1789	1820	1849	1821	1988
312	318	109	213	1764	1732	1866	1973	1844	**312**	1788	1819	1848	1820	1987
313	150	139	225	1765	1733	1867	1974	1845	**313**	1787	1818	1847	1819	1986
314	341	169	237	1766	1734	1868	1975	1846	**314**	1786	1817	1846	1818	1985
315	173	200	249	1767	1735	1869	1976	1847	**315**	1785	1816	1845	1817	1984
316	4	230	261	1768	1736	1870	1977	1848	**316**	1784	1815	1844	1816	1983
317	195	260	274	1769	1737	1871	1978	1849	**317**	1783	1814	1843	1815	1982
318	27	291	286	1770	1738	1872	1979	1850	**318**	1782	1813	1842	1814	1981
319	218	321	298	1771	1739	1873	1980	1851	**319**	1781	1812	1841	1813	1980
320	50	351	310	1772	1740	1874	1981	1852	**320**	1780	1811	1840	1812	1979

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont.*

Years; also year **A.D.** if reckoned from **1 B.C.**	Mars.	Jup.	Sat.	Mars	Merc.	Jup.	Venus.	Sat.	**B.C.**	Mars.	Merc.	Jup.	Venus.	Sat.
		Degrees.		A.D.	A.D.	A.D.	A.D.	A.D.		A.D.	A.D.	A.D.	A.D.	A.D.
321	241	22	323	1773	1741	1875	1982	1853	**321**	1779	1810	1839	1811	1978
322	72	52	335	1774	1742	1876	1983	1854	**322**	1778	1809	1838	1810	1977
323	263	82	347	1775	1743	1877	1984	1855	**323**	1777	1808	1837	1809	1976
324	95	113	359	1776	1744	1878	1985	1856	**324**	1776	1807	1836	1808	1975
325	287	143	11	1777	1745	1879	1986	1857	**325**	1775	1806	1835	1807	1974
326	118	174	24	1778	1746	1880	1987	1858	**326**	1774	1805	1834	1806	1978
327	309	204	36	1779	1747	1881	1988	1859	**327**	1773	1804	1833	1805	1972
328	141	234	48	1780	1748	1882	1989	1860	**328**	1772	1803	1832	1804	1971
329	332	265	60	1781	1749	1883	1990	1861	**329**	1771	1802	1831	1808	1970
330	164	295	73	1782	1750	1884	1991	1862	**330**	1770	1801	1830	1802	1969
331	355	325	85	1783	1751	1885	1992	1863	**331**	1769	1800	1829	1801	1968
332	186	356	97	1784	1752	1886	1993	1864	**332**	1768	1799	1828	1800	1967
333	18	26	109	1785	1753	1887	1994	1865	**333**	1767	1798	1827	1799	1966
334	209	56	121	1786	1754	1888	1995	1866	**334**	1766	1797	1826	1798	1965
335	41	87	134	1787	1755	1889	1996	1867	**335**	1765	1796	1825	1797	1964
336	232	117	146	1788	1756	1890	1997	1868	**336**	1764	1795	1824	1796	1968
337	63	147	158	1789	1757	1891	1998	1869	**337**	1763	1794	1823	1795	1962
338	255	178	170	1790	1758	1892	1999	1870	**338**	1762	1793	1822	1794	1961
339	86	208	183	1791	1759	1893	1765	1871	**339**	1761	1792	1821	1798	1960
340	278	238	195	1792	1760	1894	1766	1872	**340**	1760	1791	1820	1792	1959
341	109	269	207	1793	1761	1895	1767	1873	**341**	1759	1790	1819	1791	1958
342	300	299	219	1794	1762	1896	1768	1874	**342**	1758	1789	1818	1790	1957
343	132	329	231	1795	1763	1897	1769	1875	**343**	1757	1786	1817	1789	1956
344	323	0	244	1796	1764	1898	1770	1876	**344**	1756	1787	1816	1788	1955
345	155	30	256	1797	1765	1899	1771	1877	**345**	1755	1786	1815	1787	1954
346	346	61	268	1798	1766	1900	1772	1878	**346**	1754	1785	1814	1786	1953
347	178	91	280	1799	1767	1901	1773	1879	**347**	1753	1784	1813	1785	1952
348	9	121	293	1800	1768	1902	1774	1880	**348**	1752	1783	1812	1784	1951
349	200	152	305	1801	1769	1903	1775	1881	**349**	1751	1782	1811	1783	1950
350	82	182	317	1802	1770	1904	1776	1882	**350**	1750	1781	1810	1782	1949
351	223	212	329	1803	1771	1905	1777	1883	**351**	1749	1780	1809	1781	1948
352	55	243	341	1804	1772	1906	1778	1884	**352**	1748	1779	1808	1780	1947
353	246	273	354	1805	1773	1907	1779	1885	**353**	1747	1778	1807	1779	1946
354	77	303	6	1806	1774	1908	1780	1886	**354**	1746	1777	1806	1778	1945
355	269	334	18	1807	1775	1909	1781	1887	**355**	1745	1776	1805	1777	1944
356	100	4	30	1808	1776	1910	1782	1888	**356**	1744	1775	1804	1776	1943
357	292	34	43	1809	1777	1911	1783	1889	**357**	1743	1774	1803	1775	1942
358	123	65	55	1810	1778	1912	1784	1890	**358**	1742	1773	1802	1774	1941
359	314	95	67	1811	1779	1913	1785	1891	**359**	1741	1772	1801	1773	1999
360	146	126	79	1812	1780	1914	1786	1892	**360**	1740	1771	1800	1772	1998
361	337	156	91	1813	1781	1915	1787	1893	**361**	1739	1770	1799	1771	1997
362	169	186	104	1814	1782	1916	1788	1894	**362**	1738	1769	1798	1770	1996
363	0	217	116	1815	1783	1917	1789	1895	**363**	1737	1768	1797	1769	1995
364	191	247	128	1816	1781	1918	1790	1896	**364**	1736	1767	1796	1768	1994
365	23	277	140	1817	1785	1919	1791	1897	**365**	1735	1766	1795	1767	1993
366	214	308	152	1818	1786	1920	1792	1898	**366**	1734	1765	1794	1766	1992
367	46	338	165	1819	1787	1921	1793	1899	**367**	1733	1764	1798	1765	1991
368	237	8	177	1820	1788	1922	1794	1900	**368**	1732	1763	1792	1999	1990
369	68	39	189	1821	1789	1923	1795	1901	**369**	1731	1762	1791	1998	1989
370	260	69	201	1822	1790	1924	1796	1902	**370**	1730	1761	1790	1997	1988
371	91	99	214	1823	1791	1925	1797	1903	**371**	1729	1760	1789	1996	1987
372	283	130	226	1824	1792	1926	1798	1904	**372**	1728	1759	1788	1995	1986
373	114	160	238	1825	1793	1927	1799	1905	**373**	1727	1758	1787	1994	1985
374	305	190	250	1826	1794	1928	1800	1906	**374**	1726	1757	1786	1993	1984
375	137	221	262	1827	1795	1929	1801	1907	**375**	1725	1756	1785	1992	1983
376	328	251	275	1828	1796	1930	1802	1908	**376**	1724	1755	1784	1999	1982
377	160	281	287	1829	1797	1931	1803	1909	**377**	1723	1754	1783	1998	1981
378	351	312	299	1830	1798	1932	1804	1910	**378**	1722	1753	1782	1997	1980
379	183	342	311	1831	1799	1933	1805	1911	**379**	1721	1752	1781	1996	1979
380	14	12	324	1832	1800	1934	1806	1912	**380**	1720	1751	1780	1995	1978
381	205	43	336	1833	1801	1935	1807	1913	**381**	1719	1750	1779	1994	1977
382	37	73	348	1834	1802	1986	1808	1914	**382**	1718	1749	1778	1993	1976
383	228	103	0	1835	1803	1937	1809	1915	**383**	1717	1748	1777	1992	1975
384	59	134	12	1836	1804	1938	1810	1916	**384**	1716	1747	1776	1991	1974
385	251	164	24	1837	1805	1939	1811	1917	**385**	1715	1746	1775	1990	1973
386	82	195	37	1838	1806	1940	1812	1918	**386**	1714	1745	1774	1989	1972
387	274	225	49	1839	1807	1941	1813	1919	**387**	1713	1744	1773	1988	1971
388	105	255	61	1840	1808	1942	1814	1920	**388**	1712	1743	1772	1987	1970
389	296	286	73	1841	1809	1943	1815	1921	**389**	1711	1742	1771	1986	1969
390	128	316	85	1842	1810	1944	1816	1922	**390**	1710	1741	1770	1985	1968
391	3.9	346	98	1843	1811	1945	1817	1923	**391**	1709	1740	1769	1984	1967
392	151	17	110	1844	1812	1946	1818	1924	**392**	1708	1739	1768	1983	1966
393	342	47	122	1845	1813	1947	1819	1925	**393**	1707	1738	1767	1982	1965
394	174	77	134	1846	1814	1948	1820	1926	**394**	1706	1737	1766	1981	1964
395	5	108	147	1847	1815	1949	1821	1927	**395**	1705	1736	1765	1980	1963
396	196	138	159	1848	1816	1950	1822	1928	**396**	1704	1735	1764	1979	1962
397	28	168	171	1849	1817	1951	1823	1929	**397**	1703	1734	1763	1978	1961
398	219	199	183	1850	1818	1952	1824	1930	**398**	1702	1733	1762	1977	1960
399	51	229	195	1851	1819	1953	1825	1981	**399**	1701	1732	1761	1976	1959
400	212	259	208	1852	1820	1954	1826	1982	**400**	1700	1731	1760	1975	1958

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont*

Years; also year A.D. if reckoned from 1 B.C.	Mars.	Jup. Degrees.	Sat.	Mars. A.D.	Merc. A.D.	Jup. A.D.	Venus. A.D.	Sat. A.D.	B.C.	Mars. A.D.	Merc. A.D.	Jup. A.D.	Venus. A.D.	Sat. A.D.
401	73	290	220	1853	1821	1955	1827	1933	**401**	1699	1730	1759	1974	1957
402	265	320	232	1854	1822	1956	1828	1934	**402**	1698	1729	1758	1973	1956
403	96	350	244	1855	1823	1957	1829	1935	**403**	1697	1728	1757	1972	1955
404	288	21	257	1856	1824	1958	1830	1936	**404**	1696	1727	1756	1971	1954
405	119	51	269	1857	1825	1959	1831	1937	**405**	1695	1726	1755	1970	1953
406	310	81	281	1858	1826	1960	1832	1938	**406**	1694	1725	1754	1969	1952
407	142	112	293	1859	1827	1961	1833	1939	**407**	1693	1724	1753	1968	1951
408	333	142	305	1860	1828	1962	1834	1940	**408**	1692	1723	1752	1967	1950
409	165	173	318	1861	1829	1963	1835	1941	**409**	1691	1722	1751	1966	1949
410	356	203	330	1862	1830	1964	1836	1942	**410**	1690	1721	1750	1965	1948
411	187	233	342	1863	1831	1965	1837	1943	**411**	1689	1720	1749	1964	1947
412	19	264	354	1864	1832	1966	1838	1944	**412**	1688	1719	1748	1963	1946
413	210	294	7	1865	1833	1967	1839	1945	**413**	1687	1718	1747	1962	1945
414	42	324	19	1866	1834	1968	1840	1946	**414**	1686	1717	1746	1961	1944
415	233	355	31	1867	1835	1969	1841	1947	**415**	1685	1716	1745	1960	1943
416	64	25	43	1868	1836	1970	1842	1948	**416**	1684	1715	1744	1959	1942
417	256	55	55	1869	1837	1971	1843	1949	**417**	1683	1714	1743	1958	1941
418	87	86	68	1870	1838	1972	1844	1950	**418**	1682	1713	1742	1957	1940
419	279	116	80	1871	1839	1973	1845	1951	**419**	1681	1712	1741	1956	1939
420	110	146	92	1872	1840	1974	1846	1952	**420**	1680	1711	1740	1955	1938
421	301	177	104	1873	1841	1975	1847	1953	**421**	1679	1710	1739	1954	1937
422	133	207	116	1874	1842	1976	1848	1954	**422**	1678	1709	1738	1953	1936
423	324	237	129	1875	1843	1977	1849	1955	**423**	1677	1708	1737	1952	1935
424	156	268	141	1876	1844	1978	1850	1956	**424**	1676	1707	1736	1951	1934
425	347	298	153	1877	1845	1979	1851	1957	**425**	1675	1706	1735	1950	1933
426	178	328	165	1878	1846	1980	1852	1958	**426**	1674	1705	1734	1949	1932
427	10	359	178	1879	1847	1981	1853	1959	**427**	1673	1704	1733	1948	1931
428	201	29	190	1880	1848	1982	1854	1960	**428**	1672	1703	1732	1947	1930
429	33	59	202	1881	1849	1983	1855	1961	**429**	1671	1702	1731	1946	1929
430	224	90	214	1882	1850	1984	1856	1962	**430**	1670	1701	1730	1945	1928
431	56	120	226	1883	1851	1985	1857	1963	**431**	1669	1700	1729	1944	1927
432	247	151	239	1884	1852	1986	1858	1964	**432**	1668	1699	1728	1943	1926
433	78	181	251	1885	1853	1987	1859	1965	**433**	1667	1698	1727	1942	1925
434	270	211	263	1886	1854	1988	1860	1966	**434**	1666	1697	1726	1941	1924
435	101	242	275	1887	1855	1989	1861	1967	**435**	1665	1696	1725	1940	1923
436	293	272	288	1888	1856	1990	1862	1968	**436**	1664	1695	1724	1939	1922
437	124	302	300	1889	1857	1991	1863	1969	**437**	1663	1694	1723	1938	1921
438	315	333	312	1890	1858	1992	1864	1970	**438**	1662	1693	1722	1937	1920
439	147	3	324	1891	1859	1993	1865	1971	**439**	1661	1692	1721	1936	1919
440	338	33	336	1892	1860	1994	1866	1972	**440**	1660	1691	1720	1935	1918
441	170	64	349	1893	1861	1995	1867	1973	**441**	1659	1690	1719	1934	1917
442	1	94	1	1894	1862	1996	1868	1974	**442**	1658	1689	1718	1933	1916
443	192	124	13	1895	1863	1997	1869	1975	**443**	1657	1688	1717	1932	1915
444	24	155	25	1896	1864	1998	1870	1976	**444**	1656	1687	1716	1931	1914
445	215	185	38	1897	1865	1999	1871	1977	**445**	1655	1686	1715	1930	1913
446	47	215	50	1898	1866	1656	1872	1978	**446**	1654	1685	1714	1929	1912
447	238	246	62	1899	1867	1657	1873	1979	**447**	1653	1684	1713	1928	1911
448	69	276	74	1900	1868	1658	1874	1980	**448**	1652	1683	1712	1927	1910
449	261	306	86	1901	1869	1659	1875	1981	**449**	1651	1682	1711	1926	1909
450	92	337	99	1902	1870	1660	1876	1982	**450**	1650	1681	1710	1925	1908
451	284	7	111	1903	1871	1661	1877	1983	**451**	1649	1680	1709	1924	1907
452	115	37	123	1904	1872	1662	1878	1984	**452**	1648	1679	1708	1923	1906
453	306	68	135	1905	1873	1663	1879	1985	**453**	1647	1678	1707	1922	1905
454	138	98	147	1906	1874	1664	1880	1986	**454**	1646	1677	1706	1921	1904
455	329	129	160	1907	1875	1665	1881	1987	**455**	1645	1676	1705	1920	1903
456	161	159	172	1908	1876	1666	1882	1988	**456**	1644	1675	1704	1919	1902
457	352	189	184	1909	1877	1667	1883	1989	**457**	1643	1674	1703	1918	1901
458	183	220	196	1910	1878	1668	1884	1990	**458**	1642	1673	1702	1917	1900
459	15	250	209	1911	1879	1669	1885	1991	**459**	1641	1672	1701	1916	1899
460	206	280	221	1912	1880	1670	1886	1992	**460**	1640	1671	1700	1915	1898
461	38	311	233	1913	1881	1671	1887	1993	**461**	1639	1670	1699	1914	1897
462	229	341	245	1914	1882	1672	1888	1994	**462**	1638	1669	1698	1913	1896
463	60	11	257	1915	1883	1673	1889	1995	**463**	1637	1668	1697	1912	1895
464	252	42	270	1916	1884	1674	1890	1996	**464**	1715	1667	1696	1911	1894
465	83	72	282	1917	1885	1675	1891	1997	**465**	1714	1666	1695	1910	1893
466	275	102	294	1918	1886	1676	1892	1998	**466**	1713	1665	1694	1909	1892
467	106	133	306	1919	1887	1677	1893	1999	**467**	1712	1664	1693	1908	1891
468	297	163	319	1920	1888	1678	1894	1617	**468**	1711	1663	1692	1907	1890
469	129	193	331	1921	1889	1679	1895	1618	**469**	1710	1662	1691	1906	1889
470	320	224	343	1922	1890	1680	1896	1619	**470**	1709	1661	1690	1905	1888
471	152	254	355	1923	1891	1681	1897	1620	**471**	1708	1660	1689	1904	1887
472	343	284	7	1924	1892	1682	1898	1621	**472**	1707	1659	1688	1903	1886
473	175	315	20	1925	1893	1683	1899	1622	**473**	1706	1658	1687	1902	1885
474	6	345	32	1926	1894	1684	1900	1623	**474**	1705	1657	1686	1901	1884
475	197	15	44	1927	1895	1685	1901	1624	**475**	1704	1656	1685	1900	1883
476	29	46	56	1928	1896	1686	1902	1625	**476**	1703	1655	1684	1899	1882
477	220	76	69	1929	1897	1687	1903	1626	**477**	1702	1654	1683	1898	1881
478	52	106	81	1930	1898	1688	1904	1627	**478**	1701	1653	1682	1897	1880
479	243	137	93	1931	1899	1689	1905	1628	**479**	1700	1652	1681	1896	1879
480	74	167	105	1932	1900	1690	1906	1629	**480**	1699	1651	1680	1895	1878

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont.*

Years, also year A.D. if reckoned from 1 B.C.	Mars	Jup	Sat	Mars	Merc	Jup.	Venus	Sat	B.C.	Mars.	Merc.	Jup	Venus	Sat.
		Degrees		A.D.	A.D.	A.D.	A.D.	A.D.		A.D.	A.D.	A.D.	A.D.	A.D.
481	206	198	117	1933	1901	1691	1907	1630	**481**	1698	1650	1679	1894	1877
482	97	228	130	1934	1902	1692	1908	1631	**482**	1697	1649	1678	1893	1876
483	289	258	142	1935	1903	1693	1909	1632	**483**	1696	1648	1677	1892	1875
484	120	289	154	1936	1904	1694	1910	1633	**484**	1695	1647	1676	1891	1874
485	311	319	166	1937	1905	1695	1911	1634	**485**	1694	1646	1675	1890	1873
486	143	349	179	1938	1906	1696	1912	1635	**486**	1693	1645	1674	1889	1872
487	334	20	191	1939	1907	1697	1913	1636	**487**	1692	1999	1673	1888	1871
488	166	50	203	1940	1908	1698	1914	1637	**488**	1691	1998	1672	1887	1870
489	357	80	215	1941	1909	1699	1915	1638	**489**	1690	1997	1671	1886	1869
490	188	111	227	1942	1910	1700	1916	1639	**490**	1689	1996	1670	1885	1868
491	20	141	240	1943	1911	1701	1917	1640	**491**	1688	1995	1669	1884	1867
492	211	171	252	1944	1912	1702	1918	1641	**492**	1687	1994	1668	1883	1866
493	43	202	264	1945	1913	1703	1919	1642	**493**	1686	1993	1667	1882	1865
494	234	232	276	1946	1914	1704	1920	1643	**494**	1685	1992	1666	1881	1864
495	65	262	289	1947	1915	1705	1921	1644	**495**	1684	1991	1665	1880	1863
496	257	293	301	1948	1916	1706	1922	1645	**496**	1967	1900	1664	1879	1862
497	88	323	313	1949	1917	1707	1923	1646	**497**	1966	1989	1663	1878	1861
498	280	353	325	1950	1918	1708	1924	1647	**498**	1965	1988	1662	1877	1860
499	111	24	337	1951	1919	1709	1925	1648	**499**	1964	1987	1661	1876	1859
500	302	54	350	1952	1920	1710	1926	1649	**500**	1963	1986	1660	1875	1858
501	134	84	2	1953	1921	1711	1927	1650	**501**	1962	1985	1659	1874	1857
502	325	115	14	1954	1922	1712	1928	1651	**502**	1961	1984	1658	1873	1856
503	157	145	26	1955	1923	1713	1929	1652	**503**	1960	1983	1657	1872	1855
504	348	176	39	1956	1924	1714	1930	1653	**504**	1959	1982	1656	1871	1854
505	179	206	51	1957	1925	1715	1931	1654	**505**	1958	1981	1999	1870	1853
506	11	236	63	1958	1926	1716	1932	1655	**506**	1957	1980	1998	1869	1852
507	202	267	75	1959	1927	1717	1933	1656	**507**	1956	1979	1997	1868	1851
508	34	297	87	1960	1928	1718	1934	1657	**508**	1955	1978	1996	1867	1850
509	225	327	100	1961	1929	1719	1935	1658	**509**	1954	1977	1995	1866	1849
510	57	358	112	1962	1930	1720	1936	1659	**510**	1953	1976	1994	1865	1848
511	248	28	124	1963	1931	1721	1937	1660	**511**	1952	1975	1993	1864	1847
512	79	58	136	1964	1932	1722	1938	1661	**512**	1951	1974	1992	1863	1846
513	271	89	148	1965	1933	1723	1939	1662	**513**	1950	1973	1991	1862	1845
514	102	119	161	1966	1934	1724	1940	1663	**514**	1949	1972	1990	1861	1844
515	294	149	173	1967	1935	1725	1941	1664	**515**	1948	1971	1989	1860	1843
516	125	180	185	1968	1936	1723	1942	1665	**516**	1917	1970	1988	1859	1842
517	316	210	197	1969	1937	1727	1943	1666	**517**	1946	1969	1987	1858	1841
518	148	240	210	1970	1938	1728	1944	1667	**518**	1945	1968	1986	1857	1840
519	339	271	222	1971	1939	1729	1945	1668	**519**	1944	1967	1985	1856	1839
520	171	301	234	1972	1940	1730	1946	1669	**520**	1943	1666	1984	1855	1838
521	2	331	246	1973	1941	1731	1947	1670	**521**	1942	1665	1983	1854	1837
522	103	2	258	1974	1942	1732	1948	1671	**522**	1941	1664	1982	1853	1836
523	25	32	271	1975	1943	1733	1949	1672	**523**	1940	1663	1981	1852	1835
524	216	62	283	1976	1944	1734	1950	1673	**524**	1939	1662	1980	1851	1834
525	48	93	295	1977	1945	1735	1951	1674	**525**	1938	1661	1979	1850	1833
526	239	123	307	1978	1946	1736	1952	1675	**526**	1937	1660	1978	1849	1832
527	70	154	320	1979	1947	1737	1953	1676	**527**	1936	1659	1977	1848	1831
528	260	184	332	1980	1948	1738	1954	1677	**528**	1935	1658	1976	1847	1830
529	93	214	344	1981	1949	1739	1955	1678	**529**	1934	1657	1975	1846	1829
530	283	245	356	1982	1950	1740	1956	1679	**530**	1933	1656	1974	1845	1828
531	116	275	8	1983	1951	1741	1957	1680	**531**	1932	1655	1973	1844	1827
532	307	305	21	1984	1952	1742	1958	1681	**532**	1931	1651	1972	1843	1826
533	139	336	33	1985	1953	1743	1959	1682	**533**	1930	1953	1971	1842	1825
534	330	6	45	1986	1954	1744	1960	1683	**534**	1929	1952	1970	1841	1824
535	162	36	57	1987	1955	1745	1961	1684	**535**	1928	1951	1969	1840	1823
536	353	67	70	1988	1956	1746	1962	1685	**536**	1927	1950	1968	1839	1822
537	184	97	82	1989	1957	1747	1963	1686	**537**	1926	1949	1967	1838	1821
538	16	127	94	1990	1958	1718	1964	1687	**538**	1925	1948	1966	1837	1820
539	207	158	106	1991	1959	1749	1965	1688	**539**	1924	1947	1965	1836	1819
540	39	188	118	1992	1960	1750	1966	1689	**540**	1923	1946	1964	1835	1818
541	230	218	131	1993	1961	1751	1967	1690	**541**	1922	1945	1963	1834	1817
542	61	249	143	1994	1962	1752	1968	1691	**542**	1921	1944	1962	1833	1816
543	253	279	155	1995	1963	1753	1969	1692	**543**	1920	1943	1961	1832	1815
544	84	309	167	1996	1964	1754	1970	1693	**544**	1919	1942	1960	1831	1814
545	276	340	180	1997	1965	1755	1971	1694	**545**	1918	1941	1959	1830	1813
546	107	10	192	1998	1966	1756	1972	1695	**546**	1917	1940	1958	1829	1812
547	298	40	204	1999	1967	1757	1973	1696	**547**	1916	1939	1957	1828	1811
548	130	71	216	1637	1968	1758	1974	1697	**548**	1915	1938	1956	1827	1810
549	321	101	228	1638	1969	1759	1975	1698	**549**	1914	1937	1955	1826	1809
550	153	132	241	1639	1970	1760	1976	1699	**550**	1913	1936	1954	1825	1808
551	344	162	253	1640	1971	1761	1977	1700	**551**	1912	1935	1953	1824	1807
552	176	192	265	1641	1972	1762	1978	1701	**552**	1911	1934	1952	1823	1806
553	7	223	277	1642	1973	1763	1979	1702	**553**	1910	1933	1951	1822	1805
554	198	253	290	1643	1974	1764	1980	1703	**554**	1909	1932	1950	1821	1804
555	30	283	302	1644	1975	1765	1981	1704	**555**	1908	1931	1949	1820	1803
556	221	314	314	1645	1976	1766	1982	1705	**556**	1907	1930	1948	1819	1802
557	53	344	326	1646	1977	1767	1983	1706	**557**	1906	1929	1947	1818	1801
558	244	14	338	1647	1978	1768	1984	1707	**558**	1905	1928	1946	1817	1800
559	75	45	351	1648	1979	1769	1985	1708	**559**	1904	1927	1945	1816	1799
560	267	75	3	1649	1980	1770	1986	1709	**560**	1903	1926	1944	1815	1798

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont*

Years, also year A.D. if reckoned from 1 B.C.	Mars.	Jup.	Sat.	Mars.	Merc.	Jup	Venus	Sat	B.C.	Mars	Merc.	Jup.	Venus	Sat.
		Degrees.		A.D.	A.D.	A.D.	A.D.	A.D.		A.D.	A.D.	A.D.	A.D.	A.D.
561	98	105	15	1650	1981	1771	1987	1710	**561**	1902	1925	1943	1814	1797
562	290	136	27	1651	1982	1772	1988	1711	**562**	1901	1924	1942	1813	1796
563	121	166	40	1652	1983	1773	1989	1712	**563**	1900	1923	1941	1812	1795
564	312	196	52	1653	1984	1774	1990	1713	**564**	1899	1922	1940	1811	1794
565	144	227	64	1654	1985	1775	1991	1714	**565**	1898	1921	1939	1810	1793
566	335	257	76	1655	1986	1776	1992	1715	**566**	1897	1920	1938	1809	1792
567	167	287	88	1656	1987	1777	1993	1716	**567**	1896	1919	1937	1808	1791
568	358	318	101	1657	1988	1778	1994	1717	**568**	1895	1918	1936	1807	1790
569	189	348	113	1658	1989	1779	1995	1718	**569**	1894	1917	1935	1806	1789
570	21	18	125	1659	1990	1780	1996	1719	**570**	1893	1916	1934	1805	1788
571	212	49	137	1660	1991	1781	1997	1720	**571**	1892	1915	1933	1804	1787
572	44	79	149	1661	1992	1782	1998	1721	**572**	1891	1914	1932	1803	1786
573	235	109	162	1662	1993	1783	1999	1722	**573**	1890	1913	1931	1802	1785
574	66	140	174	1663	1994	1784	1992	1723	**574**	1889	1912	1930	1801	1784
575	258	170	186	1664	1995	1785	1993	1724	**575**	1888	1911	1929	1800	1783
576	89	201	198	1665	1996	1786	1994	1725	**576**	1887	1910	1928	1799	1782
577	281	231	211	1666	1997	1787	1995	1726	**577**	1886	1909	1927	1798	1781
578	112	261	223	1667	1998	1788	1996	1727	**578**	1885	1908	1926	1797	1780
579	303	292	235	1668	1999	1789	1997	1728	**579**	1884	1907	1925	1796	1779
580	135	322	247	1669	1645	1790	1998	1729	**580**	1883	1906	1924	1795	1778
581	326	352	259	1670	1646	1791	1999	1730	**581**	1882	1905	1923	1794	1777
582	158	23	272	1671	1647	1792	1765	1731	**582**	1881	1904	1922	1793	1776
583	349	53	284	1672	1618	1793	1766	1732	**583**	1880	1903	1921	1792	1775
584	180	83	296	1673	1649	1794	1767	1733	**584**	1879	1902	1920	1791	1774
585	12	114	308	1674	1650	1795	1768	1734	**585**	1878	1901	1919	1790	1773
586	203	144	321	1675	1651	1796	1769	1735	**586**	1877	1900	1918	1789	1772
587	35	174	333	1676	1652	1797	1770	1736	**587**	1876	1899	1917	1788	1771
588	226	205	345	1677	1653	1798	1771	1737	**588**	1875	1898	1916	1787	1770
589	58	235	357	1678	1654	1799	1772	1738	**589**	1874	1897	1915	1786	1769
590	249	265	9	1679	1655	1800	1773	1739	**590**	1873	1896	1914	1785	1768
591	80	296	22	1680	1656	1801	1774	1740	**591**	1872	1895	1913	1784	1767
592	272	326	34	1681	1657	1802	1775	1741	**592**	1871	1894	1912	1783	1766
593	103	356	46	1682	1658	1803	1776	1742	**593**	1870	1893	1911	1782	1765
594	295	27	58	1683	1659	1804	1777	1743	**594**	1869	1892	1910	1781	1764
595	126	57	71	1684	1660	1805	1778	1744	**595**	1868	1891	1909	1780	1763
596	317	87	83	1685	1661	1806	1779	1745	**596**	1867	1890	1908	1779	1762
597	149	118	95	1686	1662	1807	1780	1746	**597**	1866	1889	1907	1778	1761
598	340	148	107	1687	1663	1808	1781	1747	**598**	1865	1888	1906	1777	1760
599	172	179	119	1688	1664	1809	1782	1748	**599**	1864	1887	1905	1776	1759
600	3	209	132	1689	1665	1810	1783	1749	**600**	1863	1886	1904	1775	1758
601	194	239	144	1690	1666	1811	1784	1750	**601**	1862	1885	1903	1774	1757
602	26	270	156	1691	1667	1812	1785	1751	**602**	1861	1884	1902	1773	1756
603	217	300	168	1692	1668	1813	1786	1752	**603**	1860	1883	1901	1772	1755
604	49	330	181	1693	1669	1814	1787	1753	**604**	1859	1882	1900	1771	1754
605	240	0	193	1694	1670	1815	1788	1754	**605**	1858	1881	1899	1770	1753
606	71	31	205	1695	1671	1816	1789	1755	**606**	1857	1880	1898	1769	1752
607	262	62	217	1696	1672	1817	1790	1756	**607**	1856	1879	1897	1768	1751
608	94	92	229	1697	1673	1818	1791	1757	**608**	1855	1878	1896	1767	1750
609	286	122	242	1698	1674	1819	1792	1758	**609**	1854	1877	1895	1766	1749
610	117	153	254	1699	1675	1820	1793	1759	**610**	1853	1876	1894	1765	1748
611	308	183	266	1700	1676	1821	1794	1760	**611**	1852	1875	1893	1999	1747
612	140	213	278	1701	1677	1822	1795	1761	**612**	1851	1874	1892	1998	1746
613	331	244	291	1702	1678	1823	1796	1762	**613**	1850	1873	1891	1997	1745
614	163	274	303	1703	1679	1824	1797	1763	**614**	1849	1872	1890	1996	1744
615	354	304	315	1704	1680	1825	1798	1764	**615**	1818	1871	1889	1995	1743
616	185	335	327	1705	1681	1826	1799	1765	**616**	1847	1870	1888	1994	1742
617	17	5	339	1706	1682	1827	1800	1766	**617**	1846	1869	1887	1993	1741
618	208	35	352	1707	1683	1828	1801	1767	**618**	1845	1868	1886	1992	1740
619	40	66	4	1708	1684	1829	1802	1768	**619**	1844	1867	1885	1991	1739
620	231	96	16	1709	1685	1830	1803	1769	**620**	1843	1866	1884	1990	1738
621	62	127	28	1710	1686	1831	1804	1770	**621**	1842	1865	1883	1989	1737
622	254	157	41	1711	1687	1832	1805	1771	**622**	1841	1864	1882	1988	1736
623	85	187	53	1712	1688	1833	1806	1772	**623**	1840	1863	1881	1987	1735
624	277	218	65	1713	1689	1834	1807	1773	**624**	1839	1862	1880	1986	1734
625	108	248	77	1714	1690	1835	1808	1774	**625**	1838	1861	1879	1985	1733
626	299	278	89	1715	1691	1836	1809	1775	**626**	1837	1860	1878	1984	1732
627	131	308	102	1716	1692	1837	1810	1776	**627**	1836	1859	1877	1983	1731
628	322	339	114	1717	1693	1838	1811	1777	**628**	1835	1858	1876	1982	1730
629	154	9	126	1718	1694	1839	1812	1778	**629**	1834	1857	1875	1981	1729
630	345	40	138	1719	1695	1840	1813	1779	**630**	1833	1856	1874	1980	1728
631	177	70	150	1720	1696	1841	1814	1780	**631**	1832	1855	1873	1979	1727
632	8	100	163	1721	1697	1842	1815	1781	**632**	1831	1854	1872	1978	1726
633	199	131	175	1722	1698	1843	1816	1782	**633**	1830	1853	1871	1977	1725
634	31	161	187	1723	1699	1844	1817	1783	**634**	1829	1852	1870	1976	1724
635	222	191	199	1724	1700	1845	1818	1784	**635**	1828	1851	1869	1975	1723
636	54	222	212	1725	1701	1846	1819	1785	**636**	1827	1850	1868	1974	1722
637	245	252	224	1726	1702	1847	1820	1786	**637**	1826	1849	1867	1973	1721
638	76	282	236	1727	1703	1848	1821	1787	**638**	1825	1848	1866	1972	1720
639	268	330	248	1728	1704	1849	1822	1788	**639**	1824	1847	1865	1971	1719
640	99	343	260	1729	1705	1850	1823	1789	**640**	1823	1846	1864	1970	1718

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont.*

Years, also year **A.D.** if reckoned from **1 B.C.**	Mars.	Jup.	Sat.	Mars.	Merc.	Jup.	Venus.	Sat	**B.C.**	Mars.	Merc.	Jup.	Venus.	Sat.
		Degrees.		A.D.	A.D.	A.D.	A.D.	A.D.		A.D.	A.D.	A.D.	A.D.	A.D.
641	291	13	273	1730	1706	1851	1824	1790	**641**	1822	1845	1863	1969	1717
642	122	44	285	1731	1707	1852	1825	1791	**642**	1821	1844	1862	1968	1716
643	318	74	297	1732	1708	1853	1826	1792	**643**	1820	1843	1861	1967	1715
644	145	104	309	1733	1709	1854	1827	1793	**644**	1819	1842	1860	1966	1714
645	336	135	322	1734	1710	1855	1828	1794	**645**	1818	1841	1859	1965	1713
646	168	165	334	1735	1711	1856	1829	1795	**646**	1817	1840	1858	1964	1712
647	359	196	346	1736	1712	1857	1830	1796	**647**	1816	1839	1857	1963	1711
648	190	226	358	1737	1713	1858	1831	1797	**648**	1815	1838	1856	1962	1710
649	22	256	10	1738	1714	1859	1832	1798	**649**	1814	1837	1855	1961	1709
650	213	289	23	1739	1715	1860	1833	1799	**650**	1813	1836	1854	1960	1708
651	45	317	35	1740	1716	1861	1834	1800	**651**	1812	1835	1853	1959	1707
652	236	347	47	1741	1717	1862	1835	1801	**652**	1811	1834	1852	1958	1706
653	67	18	59	1742	1718	1863	1836	1802	**653**	1810	1833	1851	1957	1705
654	259	48	72	1743	1719	1864	1837	1803	**654**	1809	1832	1850	1956	1704
655	90	78	84	1744	1720	1865	1838	1804	**655**	1808	1831	1849	1955	1703
656	282	109	96	1745	1721	1866	1839	1805	**656**	1807	1830	1848	1954	1702
657	113	139	108	1746	1722	1867	1840	1806	**657**	1806	1829	1847	1953	1701
658	304	169	120	1747	1723	1868	1841	1807	**658**	1805	1828	1846	1952	1700
659	136	200	133	1748	1724	1869	1842	1808	**659**	1804	1827	1815	1951	1699
660	327	230	145	1749	1725	1870	1843	1809	**660**	1803	1826	1844	1950	1698
661	159	260	157	1750	1726	1871	1844	1810	**661**	1802	1825	1843	1949	1697
662	350	291	169	1751	1727	1872	1845	1811	**662**	1801	1824	1842	1948	1696
663	181	321	182	1752	1728	1873	1846	1812	**663**	1800	1823	1841	1947	1695
664	13	351	194	1753	1729	1874	1847	1813	**664**	1799	1822	1840	1946	1694
665	204	22	206	1754	1730	1875	1848	1814	**665**	1798	1821	1839	1945	1693
666	36	52	218	1755	1731	1876	1849	1815	**666**	1797	1820	1838	1944	1692
667	227	82	230	1756	1732	1877	1850	1816	**667**	1796	1819	1837	1943	1691
668	59	113	243	1757	1733	1878	1851	1817	**668**	1795	1818	1836	1942	1690
669	250	143	255	1758	1734	1879	1852	1818	**669**	1794	1817	1835	1941	1689
670	81	174	267	1759	1735	1880	1853	1819	**670**	1793	1816	1834	1940	1688
671	273	204	279	1760	1736	1881	1854	1820	**671**	1792	1815	1833	1939	1687
672	104	234	292	1761	1737	1882	1855	1821	**672**	1791	1814	1832	1938	1686
673	296	265	304	1762	1738	1883	1856	1822	**673**	1790	1813	1831	1937	1685
674	127	295	316	1763	1739	1884	1857	1823	**674**	1789	1812	1830	1936	1684
675	318	325	328	1764	1740	1885	1858	1824	**675**	1788	1811	1829	1935	1683
676	150	356	340	1765	1741	1886	1859	1825	**676**	1787	1810	1828	1934	1682
677	341	26	353	1766	1742	1887	1860	1826	**677**	1786	1809	1827	1933	1681
678	173	56	5	1767	1743	1888	1861	1827	**678**	1785	1808	1826	1932	1680
679	4	87	17	1768	1744	1889	1862	1828	**679**	1784	1807	1825	1931	1679
680	195	117	29	1769	1745	1890	1863	1829	**680**	1783	1806	1824	1930	1678
681	27	147	42	1770	1746	1891	1864	1830	**681**	1782	1805	1823	1929	1677
682	218	178	54	1771	1747	1892	1865	1831	**682**	1781	1804	1822	1928	1676
683	50	208	66	1772	1748	1893	1866	1832	**683**	1780	1803	1821	1927	1999
684	241	238	78	1773	1749	1894	1867	1833	**684**	1779	1802	1820	1926	1998
685	72	269	90	1774	1750	1895	1868	1834	**685**	1778	1801	1819	1925	1997
686	263	299	103	1775	1751	1896	1869	1835	**686**	1777	1800	1818	1924	1996
687	95	329	115	1776	1752	1897	1870	1836	**687**	1776	1799	1817	1923	1995
688	287	359	127	1777	1753	1898	1871	1837	**688**	1775	1798	1816	1922	1994
689	118	29	139	1778	1754	1899	1872	1838	**689**	1774	1797	1815	1921	1993
690	309	60	151	1779	1755	1900	1873	1839	**690**	1773	1796	1814	1920	1992
691	141	90	164	1780	1756	1901	1874	1840	**691**	1772	1795	1813	1919	1991
692	332	120	176	1781	1757	1902	1875	1841	**692**	1771	1794	1812	1918	1990
693	164	151	188	1782	1758	1903	1876	1842	**693**	1770	1793	1811	1917	1989
694	355	181	200	1783	1759	1904	1877	1843	**694**	1769	1792	1810	1916	1988
695	186	211	213	1784	1760	1905	1878	1844	**695**	1768	1791	1809	1915	1987
696	18	242	225	1785	1761	1906	1879	1845	**696**	1767	1890	1808	1914	1986
697	209	272	237	1786	1762	1907	1880	1846	**697**	1766	1789	1807	1918	1985
698	41	302	249	1787	1763	1908	1881	1847	**698**	1765	1788	1806	1912	1984
699	232	333	261	1788	1764	1909	1882	1848	**699**	1764	1787	1805	1911	1983
700	63	3	274	1789	1765	1910	1883	1849	**700**	1763	1786	1804	1910	1982
701	255	33	286	1790	1766	1911	1884	1850	**701**	1762	1785	1803	1909	1981
702	86	64	298	1791	1767	1912	1885	1851	**702**	1761	1784	1802	1908	1980
703	278	94	310	1792	1768	1913	1886	1852	**703**	1760	1783	1801	1907	1979
704	109	125	323	1793	1769	1914	1887	1853	**704**	1759	1782	1800	1906	1978
705	300	155	335	1794	1770	1915	1888	1854	**705**	1758	1781	1799	1905	1977
706	132	185	347	1795	1771	1916	1889	1855	**706**	1757	1780	1798	1904	1976
707	323	216	359	1796	1772	1917	1890	1856	**707**	1756	1779	1797	1903	1975
708	155	246	12	1797	1773	1918	1891	1857	**708**	1755	1778	1796	1902	1974
709	346	276	24	1798	1774	1919	1892	1858	**709**	1754	1777	1795	1901	1973
710	178	307	36	1799	1775	1920	1893	1859	**710**	1753	1776	1794	1900	1972
711	9	337	48	1800	1776	1921	1894	1860	**711**	1752	1775	1793	1899	1971
712	200	7	60	1801	1777	1922	1895	1861	**712**	1751	1774	1792	1898	1970
713	32	38	73	1802	1778	1923	1896	1862	**713**	1750	1773	1791	1897	1969
714	223	68	85	1803	1779	1924	1897	1863	**714**	1749	1772	1790	1896	1968
715	55	98	97	1804	1780	1925	1898	1864	**715**	1748	1771	1789	1895	1967
716	246	129	109	1805	1781	1926	1899	1865	**716**	1747	1770	1788	1894	1966
717	77	159	121	1806	1782	1927	1900	1866	**717**	1746	1769	1787	1893	1965
718	269	189	134	1807	1783	1928	1901	1867	**718**	1745	1768	1786	1892	1964
719	100	220	146	1808	1784	1929	1902	1868	**719**	1744	1767	1785	1891	1963
720	292	250	158	1809	1785	1930	1903	1869	**720**	1743	1766	1784	1890	1962

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont*

Years; also year A.D. if reckoned from 1 B.C.	Mars.	Jup.	Sat.	Mars.	Merc.	Jup.	Venus.	Sat.	B.C	Mars.	Merc.	Jup	Venus.	Sat
		Degrees.		A.D	A.D	A.D	A.D.	A.D		A.D	A.D.	A.D.	A.D.	A.D.
721	123	280	170	1810	1786	1931	1904	1870	**721**	1742	1765	1783	1889	1961
722	314	311	183	1811	1787	1932	1905	1871	**722**	1741	1764	1782	1888	1960
723	146	341	195	1812	1788	1933	1906	1872	**723**	1740	1763	1781	1887	1959
724	337	11	207	1813	1789	1934	1907	1873	**724**	1739	1762	1780	1886	1958
725	169	42	219	1814	1790	1935	1908	1874	**725**	1738	1761	1779	1885	1957
726	0	72	231	1815	1791	1936	1909	1875	**726**	1737	1760	1778	1884	1956
727	191	102	244	1816	1792	1937	1910	1876	**727**	1736	1759	1777	1883	1955
728	23	133	256	1817	1793	1938	1911	1877	**728**	1735	1758	1776	1882	1954
729	214	163	268	1818	1794	1939	1912	1878	**729**	1734	1757	1775	1881	1953
730	46	194	280	1819	1795	1940	1913	1879	**730**	1733	1756	1774	1880	1952
731	237	224	293	1820	1796	1941	1914	1880	**731**	1732	1755	1773	1879	1951
732	68	254	305	1821	1797	1942	1915	1881	**732**	1731	1754	1772	1878	1950
733	259	285	317	1822	1798	1943	1916	1882	**733**	1730	1753	1771	1877	1949
734	91	315	329	1823	1799	1944	1917	1883	**734**	1729	1752	1770	1876	1948
735	283	345	341	1824	1800	1945	1918	1884	**735**	1728	1751	1769	1875	1947
736	114	16	354	1825	1801	1946	1919	1885	**736**	1727	1750	1768	1874	1946
737	305	46	6	1826	1802	1947	1920	1886	**737**	1726	1749	1767	1873	1945
738	137	76	18	1827	1803	1948	1921	1887	**738**	1725	1748	1766	1872	1944
739	328	107	30	1828	1804	1949	1922	1888	**739**	1724	1747	1765	1871	1943
740	160	137	43	1829	1805	1950	1923	1889	**740**	1723	1746	1764	1870	1942
741	351	167	55	1830	1806	1951	1924	1890	**741**	1722	1745	1763	1869	1941
742	182	198	67	1831	1807	1952	1925	1891	**742**	1721	1744	1762	1868	1999
743	14	228	79	1832	1808	1953	1926	1892	**743**	1720	1743	1761	1867	1998
744	205	258	91	1833	1809	1954	1927	1893	**744**	1719	1742	1760	1866	1997
745	37	289	104	1834	1810	1955	1928	1894	**745**	1718	1741	1759	1865	1996
746	228	319	116	1835	1811	1956	1929	1895	**746**	1717	1740	1758	1864	1995
747	59	349	128	1836	1812	1957	1930	1896	**747**	1716	1739	1757	1863	1994
748	251	20	140	1837	1813	1958	1931	1897	**748**	1715	1738	1756	1862	1993
749	82	50	152	1838	1814	1959	1932	1898	**749**	1714	1737	1755	1861	1992
750	274	80	165	1839	1815	1960	1933	1899	**750**	1713	1736	1754	1860	1991
751	105	111	177	1840	1816	1961	1934	1900	**751**	1712	1735	1753	1859	1990
752	296	141	189	1841	1817	1962	1935	1901	**752**	1711	1734	1752	1858	1989
753	128	172	201	1842	1818	1963	1936	1902	**753**	1710	1733	1751	1857	1988
754	319	202	214	1843	1819	1964	1937	1903	**754**	1709	1732	1750	1856	1987
755	151	232	226	1844	1820	1965	1938	1904	**755**	1708	1731	1749	1855	1986
756	342	263	238	1845	1821	1966	1939	1905	**756**	1707	1730	1748	1854	1985
757	174	293	250	1846	1822	1967	1940	1906	**757**	1706	1729	1747	1853	1984
758	5	323	262	1847	1823	1968	1941	1907	**758**	1705	1728	1746	1852	1983
759	196	354	275	1848	1824	1969	1942	1908	**759**	1704	1727	1745	1851	1982
760	28	24	287	1849	1825	1970	1943	1909	**760**	1703	1726	1744	1850	1981
761	219	54	299	1850	1826	1971	1944	1910	**761**	1702	1725	1743	1849	1980
762	51	85	311	1851	1827	1972	1945	1911	**762**	1701	1724	1742	1848	1979
763	242	115	324	1852	1828	1973	1946	1912	**763**	1700	1723	1741	1847	1978
764	73	145	336	1853	1829	1974	1947	1913	**764**	1699	1722	1740	1846	1977
765	265	176	348	1854	1830	1975	1948	1914	**765**	1698	1721	1739	1845	1976
766	96	206	0	1855	1831	1976	1949	1915	**766**	1697	1720	1999	1844	1975
767	288	236	12	1856	1832	1977	1950	1916	**767**	1696	1719	1998	1843	1974
768	119	267	24	1857	1833	1978	1951	1917	**768**	1695	1718	1997	1842	1973
769	310	297	37	1858	1834	1979	1952	1918	**769**	1694	1717	1996	1841	1972
770	142	327	49	1859	1835	1980	1953	1919	**770**	1693	1716	1995	1840	1971
771	333	358	61	1860	1836	1981	1954	1920	**771**	1692	1715	1994	1839	1970
772	165	28	73	1861	1837	1982	1955	1921	**772**	1691	1714	1993	1838	1969
773	356	58	85	1862	1838	1983	1956	1922	**773**	1690	1713	1992	1837	1968
774	187	89	98	1863	1839	1984	1957	1923	**774**	1689	1712	1991	1836	1967
775	19	119	110	1864	1840	1985	1958	1924	**775**	1688	1711	1990	1835	1966
776	210	150	122	1865	1841	1986	1959	1925	**776**	1687	1710	1989	1834	1965
777	42	180	134	1866	1842	1987	1960	1926	**777**	1686	1709	1988	1833	1964
778	233	210	147	1867	1843	1988	1961	1927	**778**	1685	1708	1987	1832	1963
779	64	241	159	1868	1844	1989	1962	1928	**779**	1684	1707	1986	1831	1962
780	256	271	171	1869	1845	1990	1963	1929	**780**	1683	1706	1985	1830	1961
781	87	301	183	1870	1846	1991	1964	1930	**781**	1682	1705	1984	1829	1960
782	279	332	195	1871	1847	1992	1965	1931	**782**	1681	1704	1983	1828	1959
783	110	2	208	1872	1848	1993	1966	1932	**783**	1680	1703	1982	1827	1958
784	301	32	220	1873	1849	1994	1967	1933	**784**	1679	1702	1981	1826	1957
785	133	63	232	1874	1850	1995	1968	1934	**785**	1678	1701	1980	1825	1956
786	324	93	244	1875	1851	1996	1969	1935	**786**	1677	1700	1979	1824	1955
787	156	123	257	1876	1852	1997	1970	1936	**787**	1676	1699	1978	1823	1954
788	347	154	269	1877	1853	1998	1971	1937	**788**	1675	1698	1977	1822	1953
789	179	184	281	1878	1854	1999	1972	1938	**789**	1674	1697	1976	1821	1952
790	10	214	293	1879	1855	1739	1973	1939	**790**	1673	1696	1975	1820	1951
791	201	245	305	1880	1856	1740	1974	1940	**791**	1672	1695	1974	1819	1950
792	33	275	318	1881	1857	1741	1975	1941	**792**	1671	1694	1973	1818	1949
793	224	305	330	1882	1858	1742	1976	1942	**793**	1670	1693	1972	1817	1948
794	56	336	342	1883	1859	1743	1977	1943	**794**	1669	1692	1971	1816	1947
795	247	6	354	1884	1860	1744	1978	1944	**795**	1668	1691	1970	1815	1946
796	78	36	7	1885	1861	1745	1979	1945	**796**	1667	1690	1969	1814	1945
797	270	67	19	1886	1862	1746	1980	1946	**797**	1666	1689	1968	1813	1944
798	101	97	31	1887	1863	1747	1981	1947	**798**	1665	1688	1967	1812	1943
799	293	128	43	1888	1864	1748	1982	1948	**799**	1664	1687	1966	1811	1942
800	124	158	55	1889	1865	1749	1983	1949	**800**	1663	1686	1965	1810	1941

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont.*

Years, also year **A.D.** if reckoned from **1 B.C.**	Mars.	Jup (Degrees)	Sat.	Mars. A.D.	Merc A.D.	Jup. A.D.	Venus. A.D.	Sat. A.D.	**B.C.**	Mars. A.D.	Merc. A.D.	Jup. A.D.	Venus. A.D.	Sat. A.D.
801	315	188	68	1890	1866	1750	1984	1950	**801**	1662	1685	1964	1809	1940
802	147	219	80	1891	1867	1751	1985	1951	**802**	1661	1684	1963	1808	1939
803	338	249	92	1892	1868	1752	1986	1952	**803**	1660	1683	1962	1807	1938
804	170	279	104	1893	1869	1753	1987	1953	**804**	1659	1682	1961	1806	1937
805	1	310	116	1894	1870	1754	1988	1954	**805**	1658	1681	1960	1805	1936
806	192	340	129	1895	1871	1755	1989	1955	**806**	1657	1680	1959	1804	1935
807	24	10	141	1896	1872	1756	1990	1956	**807**	1656	1679	1958	1803	1934
808	215	41	153	1897	1873	1757	1991	1957	**808**	1655	1678	1957	1802	1933
809	47	71	165	1898	1874	1758	1992	1958	**809**	1654	1677	1956	1801	1932
810	238	101	178	1899	1875	1759	1993	1959	**810**	1653	1676	1955	1800	1931
811	69	132	190	1900	1876	1760	1994	1960	**811**	1652	1675	1954	1799	1930
812	261	162	202	1901	1877	1761	1995	1961	**812**	1651	1674	1953	1798	1929
813	92	192	214	1902	1878	1762	1996	1962	**813**	1650	1673	1952	1797	1928
814	284	223	226	1903	1879	1763	1997	1963	**814**	1649	1672	1951	1796	1927
815	115	253	239	1904	1880	1764	1998	1964	**815**	1648	1671	1950	1795	1926
816	306	283	251	1905	1881	1765	1999	1965	**816**	1647	1670	1949	1794	1925
817	138	314	263	1906	1882	1766	1765	1966	**817**	1646	1669	1948	1793	1924
818	329	344	275	1907	1883	1767	1766	1967	**818**	1645	1668	1947	1792	1923
819	161	14	288	1908	1884	1768	1767	1968	**819**	1644	1667	1946	1791	1922
820	352	45	300	1909	1885	1769	1768	1969	**820**	1643	1666	1945	1790	1921
821	183	75	312	1910	1886	1770	1769	1970	**821**	1642	1665	1944	1789	1920
822	15	105	324	1911	1887	1771	1770	1971	**822**	1641	1664	1943	1788	1919
823	206	136	336	1912	1888	1772	1771	1972	**823**	1640	1663	1942	1787	1918
824	38	166	349	1913	1889	1773	1772	1973	**824**	1639	1662	1941	1786	1917
825	229	197	1	1914	1890	1774	1773	1974	**825**	1638	1661	1940	1785	1916
826	60	227	13	1915	1891	1775	1774	1975	**826**	1637	1660	1939	1784	1915
827	252	257	25	1916	1892	1776	1775	1976	**827**	1715	1659	1938	1783	1914
828	83	288	38	1917	1893	1777	1776	1977	**828**	1714	1658	1937	1782	1913
829	275	318	50	1918	1894	1778	1777	1978	**829**	1713	1657	1936	1781	1912
830	106	348	62	1919	1895	1779	1778	1979	**830**	1712	1656	1935	1780	1911
831	297	19	74	1920	1896	1780	1779	1980	**831**	1711	1655	1934	1779	1910
832	129	49	86	1921	1897	1781	1780	1981	**832**	1710	1654	1933	1778	1909
833	320	79	99	1922	1898	1782	1781	1982	**833**	1709	1653	1932	1777	1908
834	152	110	111	1923	1899	1783	1782	1983	**834**	1708	1652	1931	1776	1907
835	343	140	123	1924	1900	1784	1783	1984	**835**	1707	1651	1930	1775	1906
836	175	170	135	1925	1901	1785	1784	1985	**836**	1706	1650	1929	1774	1905
837	6	201	147	1926	1902	1786	1785	1986	**837**	1705	1649	1928	1773	1904
838	197	231	160	1927	1903	1787	1786	1987	**838**	1704	1648	1927	1772	1903
839	29	261	172	1928	1904	1788	1787	1988	**839**	1703	1647	1926	1771	1902
840	220	292	184	1929	1905	1789	1788	1989	**840**	1702	1646	1925	1770	1901
841	52	322	196	1930	1906	1790	1789	1990	**841**	1701	1645	1924	1769	1900
842	243	352	209	1931	1907	1791	1790	1991	**842**	1700	1999	1923	1768	1899
843	74	23	221	1932	1908	1792	1791	1992	**843**	1699	1998	1922	1767	1898
844	266	53	233	1933	1909	1793	1792	1993	**844**	1698	1997	1921	1766	1897
845	97	83	245	1934	1910	1794	1793	1994	**845**	1697	1996	1920	1765	1896
846	289	114	257	1935	1911	1795	1794	1995	**846**	1696	1995	1919	1999	1895
847	120	144	270	1936	1912	1796	1795	1996	**847**	1695	1994	1918	1998	1894
848	311	175	282	1937	1913	1797	1796	1997	**848**	1694	1993	1917	1997	1893
849	143	205	294	1938	1914	1798	1797	1998	**849**	1693	1992	1916	1996	1892
850	334	235	306	1939	1915	1799	1798	1999	**850**	1692	1991	1915	1995	1891
851	166	266	319	1940	1916	1800	1799	1617	**851**	1691	1990	1914	1994	1890
852	357	296	331	1941	1917	1801	1800	1618	**852**	1690	1989	1913	1993	1889
853	188	326	343	1942	1918	1802	1801	1619	**853**	1689	1988	1912	1992	1888
854	20	357	355	1943	1919	1803	1802	1620	**854**	1688	1987	1911	1991	1887
855	211	27	7	1944	1920	1804	1803	1621	**855**	1687	1986	1910	1990	1886
856	43	57	20	1945	1921	1805	1804	1622	**856**	1686	1985	1909	1989	1885
857	234	88	32	1946	1922	1806	1805	1623	**857**	1685	1984	1908	1988	1884
858	65	118	44	1947	1923	1807	1806	1624	**858**	1684	1983	1907	1987	1883
859	257	148	56	1948	1924	1808	1807	1625	**859**	1683	1982	1906	1986	1882
860	88	179	69	1949	1925	1809	1808	1626	**860**	1682	1981	1905	1985	1881
861	280	209	81	1950	1926	1810	1809	1627	**861**	1681	1980	1904	1984	1880
862	111	239	93	1951	1927	1811	1810	1628	**862**	1680	1979	1903	1983	1879
863	302	270	105	1952	1928	1812	1811	1629	**863**	1679	1978	1902	1982	1878
864	134	300	117	1953	1929	1813	1812	1630	**864**	1678	1977	1901	1981	1877
865	325	330	130	1954	1930	1814	1813	1631	**865**	1677	1976	1900	1980	1876
866	157	1	142	1955	1931	1815	1814	1632	**866**	1676	1975	1899	1979	1875
867	348	31	154	1956	1932	1816	1815	1633	**867**	1675	1974	1898	1978	1874
868	179	61	166	1957	1933	1817	1816	1634	**868**	1674	1973	1897	1977	1873
869	11	92	179	1958	1934	1818	1817	1635	**869**	1673	1972	1896	1976	1872
870	202	122	191	1959	1935	1819	1818	1636	**870**	1672	1971	1895	1975	1871
871	34	153	203	1960	1936	1820	1819	1637	**871**	1671	1970	1894	1974	1870
872	225	183	215	1961	1937	1821	1820	1638	**872**	1670	1969	1893	1973	1869
873	57	213	227	1962	1938	1822	1821	1639	**873**	1669	1968	1892	1972	1868
874	248	244	240	1963	1939	1823	1822	1640	**874**	1668	1967	1891	1971	1867
875	79	274	252	1964	1940	1824	1823	1641	**875**	1667	1966	1890	1970	1866
876	271	304	264	1965	1941	1825	1824	1642	**876**	1666	1965	1889	1969	1865
877	102	335	276	1966	1942	1826	1825	1643	**877**	1665	1964	1888	1968	1864
878	294	5	289	1967	1943	1827	1826	1644	**878**	1664	1963	1887	1967	1863
879	125	35	301	1968	1944	1828	1827	1645	**879**	1663	1962	1886	1966	1862
880	316	66	313	1969	1945	1829	1828	1646	**880**	1662	1961	1885	1965	1861

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont.*

Years; also year A.D. if reckoned from 1 B.C.	Mars.	Jup.	Sat.	Mars.	Merc.	Jup	Venus	Sat	B.C	Mars.	Merc.	Jup.	Venus	Sat.
A.D.		Degrees		A.D.	A.D.	A.D.	A.D	A.D.		A.D.	A.D.	A.D.	A.D.	A.D.
881	148	96	325	1970	1946	1830	1829	1647	**881**	1661	1960	1884	1964	1860
882	339	126	337	1971	1947	1831	1830	1648	**882**	1660	1959	1883	1963	1859
883	171	157	350	1972	1948	1832	1831	1649	**883**	1659	1958	1882	1962	1858
884	2	187	2	1973	1949	1833	1832	1650	**884**	1658	1957	1881	1961	1857
885	193	217	14	1974	1950	1834	1833	1651	**885**	1657	1956	1880	1960	1856
886	25	248	26	1975	1951	1835	1834	1652	**886**	1656	1955	1879	1959	1855
887	216	278	39	1976	1952	1836	1835	1653	**887**	1655	1954	1878	1958	1854
888	48	308	51	1977	1953	1837	1836	1654	**888**	1654	1953	1877	1957	1853
889	239	339	63	1978	1954	1838	1837	1655	**889**	1653	1952	1876	1956	1852
890	70	9	75	1979	1955	1839	1838	1656	**890**	1652	1951	1875	1955	1851
891	261	39	87	1980	1956	1840	1839	1657	**891**	1651	1950	1874	1954	1850
892	93	70	100	1981	1957	1841	1810	1658	**892**	1650	1949	1873	1953	1849
893	285	100	112	1982	1958	1842	1841	1659	**893**	1649	1948	1872	1952	1848
894	116	131	124	1983	1959	1843	1842	1660	**894**	1648	1947	1871	1951	1847
895	307	161	136	1984	1960	1844	1843	1661	**895**	1647	1946	1870	1950	1846
896	139	191	148	1985	1961	1845	1844	1662	**896**	1646	1945	1869	1949	1845
897	330	222	161	1986	1962	1846	1845	1663	**897**	1645	1944	1868	1948	1844
898	162	252	173	1987	1963	1847	1846	1664	**898**	1644	1943	1867	1947	1843
899	353	282	185	1988	1964	1848	1847	1665	**899**	1643	1942	1866	1946	1842
900	184	313	197	1989	1965	1849	1848	1666	**900**	1642	1941	1865	1945	1841
901	16	343	210	1990	1966	1850	1849	1667	**901**	1641	1940	1864	1944	1840
902	207	13	222	1991	1967	1851	1850	1668	**902**	1640	1939	1863	1943	1839
903	39	44	234	1992	1968	1852	1851	1669	**903**	1639	1938	1862	1942	1838
904	230	74	246	1993	1969	1853	1852	1670	**904**	1638	1937	1861	1941	1837
905	61	104	258	1994	1970	1854	1853	1671	**905**	1637	1936	1860	1940	1836
906	253	135	271	1995	1971	1855	1854	1672	**906**	1920	1935	1859	1939	1835
907	84	165	283	1996	1972	1856	1855	1673	**907**	1919	1934	1858	1938	1834
908	276	195	295	1997	1973	1857	1856	1674	**908**	1918	1933	1857	1937	1833
909	107	226	307	1998	1974	1858	1857	1675	**909**	1917	1932	1856	1936	1832
910	298	256	320	1999	1975	1859	1858	1676	**910**	1916	1931	1855	1935	1831
911	130	286	332	1637	1976	1860	1859	1677	**911**	1915	1930	1854	1934	1830
912	321	317	344	1638	1977	1861	1860	1678	**912**	1914	1929	1853	1933	1829
913	153	347	356	1639	1978	1862	1861	1679	**913**	1913	1928	1852	1932	1828
914	344	17	8	1640	1979	1863	1862	1680	**914**	1912	1927	1851	1931	1827
915	176	48	21	1641	1980	1864	1863	1681	**915**	1911	1926	1850	1930	1826
916	7	78	33	1642	1981	1865	1864	1682	**916**	1910	1925	1849	1929	1825
917	198	108	45	1643	1982	1866	1865	1683	**917**	1909	1924	1848	1928	1824
918	30	139	57	1644	1983	1867	1866	1684	**918**	1908	1923	1847	1927	1823
919	221	169	70	1645	1984	1868	1867	1685	**919**	1907	1922	1846	1926	1822
920	53	200	82	1646	1985	1869	1868	1686	**920**	1906	1921	1845	1925	1821
921	244	230	94	1647	1986	1870	1869	1687	**921**	1905	1920	1844	1924	1820
922	75	260	106	1648	1987	1871	1870	1688	**922**	1904	1919	1843	1923	1819
923	267	291	118	1649	1988	1872	1871	1689	**923**	1903	1918	1842	1922	1818
924	98	321	131	1650	1989	1873	1872	1690	**924**	1902	1917	1841	1921	1817
925	290	351	143	1651	1990	1874	1873	1691	**925**	1901	1916	1840	1920	1816
926	121*	22	155	1652	1991	1875	1874	1692	**926**	1900	1915	1839	1919	1815
927	312	52	167	1653	1992	1876	1875	1693	**927**	1899	1914	1838	1918	1814
928	144	82	180	1654	1993	1877	1876	1694	**928**	1898	1913	1837	1917	1813
929	335	113	192	1655	1994	1878	1877	1695	**929**	1897	1912	1836	1916	1812
930	167	143	204	1656	1995	1879	1878	1696	**930**	1896	1911	1835	1915	1811
931	358	173	216	1657	1996	1880	1879	1697	**931**	1895	1910	1834	1914	1810
932	189	204	228	1658	1997	1881	1880	1698	**932**	1894	1909	1833	1913	1809
933	21	234	241	1659	1998	1882	1881	1699	**933**	1893	1908	1832	1912	1808
934	212	264	253	1660	1999	1883	1882	1700	**934**	1892	1907	1831	1911	1807
935	44	295	265	1661	1645	1884	1883	1701	**935**	1891	1906	1830	1910	1806
936	235	325	277	1662	1646	1885	1884	1702	**936**	1890	1905	1829	1909	1805
937	66	355	290	1663	1647	1886	1385	1703	**937**	1889	1904	1828	1908	1804
938	258	26	302	1664	1648	1887	1886	1704	**938**	1888	1903	1827	1907	1803
939	89	56	314	1665	1649	1888	1887	1705	**939**	1887	1902	1826	1906	1802
940	281	86	326	1666	1650	1889	1888	1706	**940**	1886	1901	1825	1905	1801
941	112	117	338	1667	1651	1890	1889	1707	**941**	1885	1900	1824	1904	1800
942	303	147	351	1668	1652	1891	1890	1708	**942**	1884	1899	1823	1903	1799
943	135	178	3	1669	1653	1892	1891	1709	**943**	1883	1898	1822	1902	1798
944	326	208	15	1670	1654	1893	1892	1710	**944**	1882	1897	1821	1901	1797
945	158	238	27	1671	1655	1894	1893	1711	**945**	1881	1896	1820	1900	1796
946	349	269	40	1672	1656	1895	1894	1712	**946**	1880	1895	1819	1899	1795
947	180	299	52	1673	1657	1896	1895	1713	**947**	1879	1894	1818	1898	1794
948	12	329	64	1974	1658	1897	1896	1714	**948**	1878	1893	1817	1897	1793
949	203	0	76	1675	1659	1898	1897	1715	**949**	1877	1892	1816	1896	1792
950	35	30	88	1676	1660	1899	1898	1716	**950**	1876	1891	1815	1895	1791
951	226	61	101	1677	1661	1900	1899	1717	**951**	1875	1890	1814	1894	1790
952	58	91	113	1678	1662	1901	1900	1718	**952**	1874	1889	1813	1893	1789
953	249	121	125	1679	1663	1902	1901	1719	**953**	1873	1888	1812	1892	1788
954	80	152	137	1680	1664	1903	1902	1720	**954**	1872	1887	1811	1891	1787
955	272	182	149	1681	1665	1904	1903	1721	**955**	1871	1886	1810	1890	1786
956	103	212	162	1682	1666	1905	1904	1722	**956**	1870	1885	1809	1889	1785
957	295	243	174	1683	1667	1906	1905	1723	**957**	1869	1884	1808	1888	1784
958	126	273	186	1684	1668	1907	1906	1724	**958**	1868	1883	1807	1887	1783
959	317	303	198	1685	1669	1908	1907	1725	**959**	1867	1882	1806	1886	1782
960	149	334	211	1686	1670	1909	1908	1726	**960**	1866	1881	1805	1885	1781

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc—*cont.*

Years; also year A.D. if reckoned from 1 B C	Mars.	Jup	Sat	Mars.	Merc.	Jup	Venus.	Sat.	B.C.	Mars.	Merc.	Jup.	Venus.	Sat.
		Degrees.		A.D.	A D	A.D.	A.D.	A D.		A.D	A D	A.D.	A D.	A.D.
961	340	4	223	1687	1671	1910	1909	1727	**961**	1865	1880	1804	1884	1780
962	172	34	235	1688	1672	1911	1910	1728	**962**	1864	1879	1803	1883	1779
963	3	65	247	1689	1673	1912	1911	1729	**963**	1863	1878	1802	1882	1778
964	194	95	259	1690	1674	1913	1912	1730	**964**	1862	1877	1801	1881	1777
965	26	126	272	1691	1675	1914	1913	1731	**965**	1861	1876	1800	1880	1776
966	217	156	284	1692	1676	1915	1914	1732	**966**	1860	1875	1799	1879	1775
967	49	186	296	1693	1677	1916	1915	1733	**967**	1859	1874	1798	1878	1774
968	240	217	308	1694	1678	1917	1916	1734	**968**	1858	1873	1797	1877	1773
969	71	247	321	1695	1679	1918	1917	1735	**969**	1857	1872	1796	1876	1772
970	262	277	333	1696	1680	1919	1918	1736	**970**	1856	1871	1795	1875	1771
971	94	308	345	1697	1681	1920	1919	1737	**971**	1855	1870	1794	1874	1770
972	286	338	357	1698	1682	1921	1920	1738	**972**	1854	1869	1793	1873	1769
973	117	8	9	1699	1683	1922	1921	1739	**973**	1853	1868	1792	1872	1768
974	308	39	22	1700	1684	1923	1922	1740	**974**	1852	1867	1791	1871	1767
975	140	69	34	1701	1685	1924	1923	1741	**975**	1851	1866	1790	1870	1766
976	331	99	46	1702	1686	1925	1924	1742	**976**	1850	1865	1789	1869	1765
977	163	130	58	1703	1687	1926	1925	1743	**977**	1849	1864	1788	1868	1764
978	354	160	71	1704	1688	1927	1926	1744	**978**	1848	1863	1787	1867	1763
979	185	190	83	1705	1689	1928	1927	1745	**979**	1847	1862	1786	1866	1762
980	17	221	95	1706	1690	1929	1928	1746	**980**	1846	1861	1785	1865	1761
981	208	251	107	1707	1691	1930	1929	1747	**981**	1845	1860	1784	1864	1760
982	40	281	119	1708	1692	1931	1930	1748	**982**	1844	1859	1783	1863	1759
983	231	312	132	1709	1693	1932	1931	1749	**983**	1843	1858	1782	1862	1758
984	62	342	144	1710	1694	1933	1932	1750	**984**	1842	1857	1781	1861	1757
985	254	12	156	1711	1695	1934	1933	1751	**985**	1841	1856	1780	1860	1756
986	85	43	168	1712	1696	1935	1934	1752	**986**	1840	1855	1779	1859	1755
987	277	73	181	1713	1697	1936	1935	1753	**987**	1839	1854	1778	1858	1754
988	108	103	193	1714	1698	1937	1936	1754	**988**	1838	1853	1777	1857	1753
989	299	134	205	1715	1699	1938	1937	1755	**989**	1837	1852	1776	1856	1752
990	131	164	217	1716	1700	1939	1938	1756	**990**	1836	1851	1775	1855	1751
991	322	195	229	1717	1701	1940	1939	1757	**991**	1835	1850	1774	1854	1750
992	154	225	242	1718	1702	1941	1940	1758	**992**	1834	1849	1773	1853	1749
993	345	255	254	1719	1703	1942	1941	1759	**993**	1833	1848	1772	1852	1748
994	177	286	266	1720	1704	1943	1942	1760	**994**	1832	1847	1771	1851	1747
995	8	316	278	1721	1705	1944	1943	1761	**995**	1831	1846	1770	1850	1746
996	199	346	291	1722	1706	1945	1944	1762	**996**	1830	1845	1769	1849	1745
997	31	17	303	1723	1707	1946	1945	1763	**997**	1829	1844	1768	1848	1744
998	222	47	315	1724	1708	1947	1946	1764	**998**	1828	1843	1767	1847	1743
999	54	77	327	1725	1709	1948	1947	1765	**999**	1827	1842	1766	1846	1742
1000	245	108	339	1726	1710	1949	1948	1766	**1000**	1826	1841	1765	1845	1741
1001	76	138	352	1727	1711	1950	1949	1767	**1001**	1825	1840	1764	1844	1740
1002	268	168	4	1728	1712	1951	1950	1768	**1002**	1824	1839	1763	1843	1739
1003	99	198	16	1729	1713	1952	1951	1769	**1003**	1823	1838	1762	1842	1738
1004	291	229	28	1730	1714	1953	1952	1770	**1004**	1822	1837	1761	1841	1737
1005	122	259	40	1731	1715	1954	1953	1771	**1005**	1821	1836	1760	1840	1736
1006	314	289	52	1732	1716	1955	1954	1772	**1006**	1820	1835	1759	1839	1735
1007	145	320	65	1733	1717	1956	1955	1773	**1007**	1819	1834	1758	1838	1734
1008	336	350	77	1734	1718	1957	1956	1774	**1008**	1818	1833	1757	1837	1733
1009	168	21	89	1735	1719	1958	1957	1775	**1009**	1817	1832	1756	1836	1732
1010	359	51	101	1736	1720	1959	1958	1776	**1010**	1816	1831	1755	1835	1731
1011	191	81	113	1737	1721	1960	1959	1777	**1011**	1815	1830	1754	1834	1730
1012	22	112	126	1738	1722	1961	1960	1778	**1012**	1814	1829	1753	1833	1729
1013	213	142	138	1739	1723	1962	1961	1779	**1013**	1813	1828	1752	1832	1728
1014	45	172	150	1740	1724	1963	1962	1780	**1014**	1812	1827	1751	1831	1727
1015	236	203	162	1741	1725	1964	1963	1781	**1015**	1811	1826	1750	1830	1726
1016	68	233	175	1742	1726	1965	1964	1782	**1016**	1810	1825	1749	1829	1725
1017	259	263	187	1743	1727	1966	1965	1783	**1017**	1809	1824	1748	1828	1724
1018	91	294	199	1744	1728	1967	1966	1784	**1018**	1808	1823	1747	1827	1723
1019	282	324	211	1745	1729	1968	1967	1785	**1019**	1807	1822	1746	1826	1722
1020	113	354	223	1746	1730	1969	1968	1786	**1020**	1806	1821	1745	1825	1721
1021	305	25	236	1747	1731	1970	1969	1787	**1021**	1805	1820	1744	1824	1720
1022	136	55	248	1748	1732	1971	1970	1788	**1022**	1804	1819	1743	1823	1719
1023	328	86	260	1749	1733	1972	1971	1789	**1023**	1803	1818	1742	1822	1718
1024	159	116	272	1750	1734	1973	1972	1790	**1024**	1802	1817	1741	1821	1717

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont.*

Years; also year A.D. if reckoned from 1 B.C.	Mars. (Degrees.)	Jup. (Degrees.)	Sat. (Degrees.)	Mars. (A.D.)	Merc. (A.D.)	Jup. (A.D.)	Ven. (A.D.)	Sat. (A.D.)
1025	350	146	285	1751	1735	1974	1973	1791
1026	182	176	297	1752	1736	1975	1974	1792
1027	13	207	309	1753	1737	1976	1975	1793
1028	205	237	321	1754	1738	1977	1976	1794
1029	36	267	333	1755	1739	1978	1977	1795
1030	227	298	346	1756	1740	1979	1978	1796
1031	59	328	358	1757	1741	1980	1979	1797
1032	250	359	10	1758	1742	1981	1980	1798
1033	82	29	22	1759	1743	1982	1981	1799
1034	273	59	34	1760	1744	1983	1982	1800
1035	104	90	47	1761	1745	1984	1983	1801
1036	296	120	59	1762	1746	1985	1984	1802
1037	127	150	71	1763	1747	1986	1985	1803
1038	319	181	83	1764	1748	1987	1986	1804
1039	150	211	96	1765	1749	1988	1987	1805
1040	341	241	108	1766	1750	1989	1988	1806
1041	173	272	120	1767	1751	1990	1989	1807
1042	4	302	132	1768	1752	1991	1990	1808
1043	196	332	144	1769	1753	1992	1991	1809
1044	27	3	157	1770	1754	1993	1992	1810
1045	218	33	169	1771	1755	1994	1993	1811
1046	50	63	181	1772	1756	1995	1994	1812
1047	241	94	193	1773	1757	1996	1995	1813
1048	73	124	206	1774	1758	1997	1996	1814
1049	264	154	218	1775	1759	1998	1997	1815
1050	95	185	230	1776	1760	1999	1998	1816
1051	287	215	242	1777	1761	1656	1999	1817
1052	118	245	254	1778	1762	1657	1765	1818
1053	310	276	267	1779	1763	1658	1766	1819
1054	141	306	279	1780	1764	1659	1767	1820
1055	333	337	291	1781	1765	1660	1768	1821
1056	164	7	303	1782	1766	1661	1769	1822
1057	355	37	316	1783	1767	1662	1770	1823
1058	187	68	328	1784	1768	1663	1771	1824
1059	18	98	340	1785	1769	1664	1772	1825
1060	210	128	352	1786	1770	1665	1773	1826
1061	41	159	4	1787	1771	1666	1774	1827
1062	232	189	17	1788	1772	1667	1775	1828
1063	64	219	29	1789	1773	1668	1776	1829
1064	255	250	41	1790	1774	1669	1777	1830
1065	87	280	53	1791	1775	1670	1778	1831
1066	278	310	65	1792	1776	1671	1779	1832
1067	109	341	78	1793	1777	1672	1780	1833
1068	301	11	90	1794	1778	1673	1781	1834
1069	132	41	102	1795	1779	1674	1782	1835
1070	324	72	114	1796	1780	1675	1783	1836
1071	155	102	127	1797	1781	1676	1784	1837
1072	346	132	139	1798	1782	1677	1785	1838
1073	178	163	151	1799	1783	1678	1786	1839
1074	9	193	163	1800	1784	1679	1787	1840
1075	201	223	175	1801	1785	1680	1788	1841
1076	32	254	188	1802	1786	1681	1789	1842
1077	223	284	200	1803	1787	1682	1790	1843
1078	55	314	212	1804	1788	1683	1791	1844
1079	246	345	224	1805	1789	1684	1792	1845
1080	78	15	237	1806	1790	1685	1793	1846
1081	269	46	249	1807	1791	1686	1794	1847
1082	100	76	261	1808	1792	1687	1795	1848
1083	292	106	273	1809	1793	1688	1796	1849
1084	123	137	285	1810	1794	1689	1797	1850
1085	315	167	298	1811	1795	1690	1798	1851
1086	146	197	310	1812	1796	1691	1799	1852
1087	337	228	322	1813	1797	1692	1800	1853
1088	169	258	334	1814	1798	1693	1801	1854
1089	0	288	347	1815	1799	1694	1802	1855
1090	192	319	359	1816	1800	1695	1803	1856
1091	23	349	11	1817	1801	1696	1804	1857
1092	215	19	23	1818	1802	1697	1805	1858
1093	46	50	35	1819	1803	1698	1806	1859
1094	237	80	48	1820	1804	1699	1807	1860
1095	69	110	60	1821	1805	1700	1808	1861
1096	260	141	72	1822	1806	1701	1809	1862
1097	92	171	84	1823	1807	1702	1810	1863
1098	283	201	96	1824	1808	1703	1811	1864
1099	114	232	109	1825	1809	1704	1812	1865
1100	306	262	121	1826	1810	1705	1813	1866
1101	137	292	133	1827	1811	1706	1814	1867
1102	329	323	145	1828	1812	1707	1815	1868
1103	160	353	158	1829	1813	1708	1816	1869
1104	351	24	170	1830	1814	1709	1817	1870
1105	183	54	182	1831	1815	1710	1818	1871
1106	14	84	194	1832	1816	1711	1819	1872
1107	206	115	206	1833	1817	1712	1820	1873
1108	37	145	219	1834	1818	1713	1821	1874
1109	228	175	231	1835	1819	1714	1822	1875
1110	60	206	243	1836	1820	1715	1823	1876
1111	251	236	255	1837	1821	1716	1824	1877
1112	83	6	268	1838	1822	1717	1825	1878
1113	274	297	280	1839	1823	1718	1826	1879
1114	105	327	292	1840	1824	1719	1827	1880
1115	297	357	304	1841	1825	1720	1828	1881
1116	128	28	316	1842	1826	1721	1829	1882
1117	320	58	329	1843	1827	1722	1830	1883
1118	151	88	341	1844	1828	1723	1831	1884
1119	342	119	353	1845	1829	1724	1832	1885
1120	174	149	5	1846	1830	1725	1833	1886
1121	5	179	18	1847	1831	1726	1834	1887
1122	197	210	30	1848	1832	1727	1835	1888
1123	28	240	42	1849	1833	1728	1836	1889
1124	219	270	54	1850	1834	1729	1837	1890
1125	51	301	66	1851	1835	1730	1838	1891
1126	242	331	79	1852	1836	1731	1839	1892
1127	74	2	91	1853	1837	1732	1840	1893
1128	265	32	103	1854	1838	1733	1841	1894
1129	97	62	115	1855	1839	1734	1842	1895
1130	288	93	127	1856	1840	1735	1843	1896
1131	119	123	140	1857	1841	1736	1844	1897
1132	311	153	152	1858	1842	1737	1845	1898
1133	142	184	164	1859	1843	1738	1846	1899
1134	334	214	176	1860	1844	1739	1847	1900
1135	165	244	189	1861	1845	1740	1848	1901
1136	356	275	201	1862	1846	1741	1849	1902
1137	188	305	213	1863	1847	1742	1850	1903
1138	19	335	225	1864	1848	1743	1851	1904
1139	211	6	237	1865	1849	1744	1852	1905
1140	42	36	250	1866	1850	1745	1853	1906
1141	233	66	262	1867	1851	1746	1854	1907
1142	65	97	274	1868	1852	1747	1855	1908
1143	256	127	286	1869	1853	1748	1856	1909
1144	88	157	299	1870	1854	1749	1857	1910
1145	279	188	311	1871	1855	1750	1858	1911
1146	110	218	323	1872	1856	1751	1859	1912
1147	302	248	335	1873	1857	1752	1860	1913
1148	133	279	347	1874	1858	1753	1861	1914
1149	325	309	0	1875	1859	1754	1862	1915
1150	156	340	12	1876	1860	1755	1863	1916
1151	347	10	24	1877	1861	1756	1864	1917
1152	179	40	36	1878	1862	1757	1865	1918
1153	10	71	49	1879	1863	1758	1866	1919
1154	202	101	61	1880	1864	1759	1867	1920
1155	33	131	73	1881	1865	1760	1868	1921
1156	224	162	85	1882	1866	1761	1869	1922
1157	56	192	97	1883	1867	1762	1870	1923
1158	247	221	110	1884	1868	1763	1871	1924
1159	79	253	122	1885	1869	1764	1872	1925
1160	270	283	134	1886	1870	1765	1873	1926
1161	101	313	146	1887	1871	1766	1874	1927
1162	292	344	159	1888	1872	1767	1875	1928
1163	124	14	171	1889	1873	1768	1876	1929
1164	316	44	183	1890	1874	1769	1877	1930
1165	147	75	195	1891	1875	1770	1878	1931
1166	339	105	207	1892	1876	1771	1879	1932
1167	170	135	220	1893	1877	1772	1880	1933
1168	1	166	232	1894	1878	1773	1881	1934
1169	193	196	244	1895	1879	1774	1882	1935
1170	24	226	256	1896	1880	1775	1883	1936
1171	216	257	268	1897	1881	1776	1884	1937
1172	47	287	281	1898	1882	1777	1885	1938
1173	238	317	293	1899	1883	1778	1886	1939
1174	70	348	305	1900	1884	1779	1887	1940
1175	261	18	317	1901	1885	1780	1888	1941
1176	93	49	330	1902	1886	1781	1889	1942
1177	284	79	342	1903	1887	1782	1890	1943
1178	115	109	354	1904	1888	1783	1891	1944
1179	307	140	6	1905	1889	1784	1892	1945
1180	138	170	18	1906	1890	1785	1893	1946
1181	330	200	31	1907	1891	1786	1894	1947
1182	161	231	43	1908	1892	1787	1895	1948
1183	352	261	55	1909	1893	1788	1896	1949
1184	184	291	67	1910	1894	1789	1897	1950

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont.*

Years, also year A.D. if reckoned from 1 B.C.	Mars.	Jup.	Sat	Mars.	Merc	Jup	Ven.	Sat.
	Degrees			A.D.	A.D.	A.D.	A.D.	A.D.
1185	15	322	80	1911	1895	1790	1898	1951
1186	207	352	92	1912	1896	1791	1899	1952
1187	38	22	104	1913	1897	1792	1900	1953
1188	229	53	116	1914	1898	1793	1901	1954
1189	61	83	128	1915	1899	1794	1902	1955
1190	252	113	141	1916	1900	1795	1903	1956
1191	81	144	153	1917	1901	1796	1904	1957
1192	275	174	165	1918	1902	1797	1905	1958
1193	106	204	177	1919	1903	1798	1906	1959
1194	298	235	190	1920	1904	1799	1907	1960
1195	129	265	202	1921	1905	1800	1908	1961
1196	321	205	214	1922	1906	1801	1909	1962
1197	152	326	226	1923	1907	1802	1910	1963
1198	343	356	238	1924	1908	1803	1911	1964
1199	175	27	251	1925	1909	1804	1912	1965
1200	6	57	263	1926	1910	1805	1913	1966
1201	198	87	275	1927	1911	1806	1914	1967
1202	29	118	287	1928	1912	1807	1915	1968
1203	220	148	299	1929	1913	1808	1916	1969
1204	52	178	312	1930	1914	1809	1917	1970
1205	243	209	324	1931	1915	1810	1918	1971
1206	75	239	336	1932	1916	1811	1919	1972
1207	266	269	348	1933	1917	1812	1920	1973
1208	98	300	1	1934	1918	1813	1921	1974
1209	289	330	13	1935	1919	1814	1922	1975
1210	120	0	25	1936	1920	1815	1923	1976
1211	312	31	37	1937	1921	1816	1924	1977
1212	143	61	49	1938	1922	1817	1925	1978
1213	335	91	62	1939	1923	1818	1926	1979
1214	166	122	74	1940	1924	1819	1927	1980
1215	357	152	86	1941	1925	1820	1928	1981
1216	189	182	98	1942	1926	1821	1929	1982
1217	20	213	111	1943	1927	1822	1930	1983
1218	212	243	123	1944	1928	1823	1931	1984
1219	43	273	135	1945	1929	1824	1932	1985
1220	234	304	147	1946	1930	1825	1933	1986
1221	66	334	159	1947	1931	1826	1934	1987
1222	257	4	172	1948	1932	1827	1935	1988
1223	89	35	184	1949	1933	1828	1936	1989
1224	280	65	196	1950	1934	1829	1937	1990
1225	111	96	208	1951	1935	1830	1938	1991
1226	303	126	221	1952	1936	1831	1939	1992
1227	134	156	233	1953	1937	1832	1940	1993
1228	326	187	245	1954	1938	1833	1941	1994
1229	157	217	257	1955	1939	1834	1942	1995
1230	348	247	269	1956	1940	1835	1943	1996
1231	180	278	282	1957	1941	1836	1944	1997
1232	11	308	294	1958	1942	1837	1945	1998
1233	203	338	306	1959	1943	1838	1946	1999
1234	34	9	318	1960	1944	1839	1947	1617
1235	225	39	331	1961	1945	1840	1948	1618
1236	57	69	343	1962	1946	1841	1949	1619
1237	248	100	355	1963	1947	1842	1950	1620
1238	80	130	7	1964	1948	1843	1951	1621
1239	271	160	19	1965	1949	1844	1952	1622
1240	102	191	32	1966	1950	1845	1953	1623
1241	293	221	44	1967	1951	1846	1954	1624
1242	125	251	56	1968	1952	1847	1955	1625
1243	317	282	68	1969	1953	1848	1956	1626
1244	148	312	80	1970	1954	1849	1957	1627
1245	340	343	93	1971	1955	1850	1958	1628
1246	171	13	105	1972	1956	1851	1959	1629
1247	2	43	117	1973	1957	1852	1960	1630
1248	194	74	129	1974	1958	1853	1961	1631
1249	25	104	142	1975	1959	1854	1962	1632
1250	217	134	154	1976	1960	1855	1963	1633
1251	48	165	166	1977	1961	1856	1964	1634
1252	239	195	178	1978	1962	1857	1965	1635
1253	71	224	190	1979	1963	1858	1966	1636
1254	262	256	203	1980	1964	1859	1967	1637
1255	94	286	215	1981	1965	1860	1968	1638
1256	285	316	227	1982	1966	1861	1969	1639
1257	116	347	239	1983	1967	1862	1970	1640
1258	308	17	252	1984	1968	1863	1971	1641
1259	139	47	264	1985	1969	1864	1972	1642
1260	331	78	276	1986	1970	1865	1973	1643
1261	162	108	288	1987	1971	1866	1974	1644
1262	353	138	300	1988	1972	1867	1975	1645
1263	185	169	313	1989	1973	1868	1976	1646
1264	16	199	325	1990	1974	1869	1977	1647

Years, also year A.D. if reckoned from 1 B.C.	Mrs.	Jup.	Sat	Mars.	Merc	Jup.	Ven.	Sat.
	Degrees			A.D.	A.D.	A.D.	A.D.	A.D.
1265	208	229	337	1991	1975	1870	1978	1648
1266	39	260	349	1992	1976	1871	1979	1649
1267	230	290	2	1993	1977	1872	1980	1650
1268	62	321	14	1994	1978	1873	1981	1651
1269	253	351	26	1995	1979	1874	1982	1652
1270	85	21	38	1996	1980	1875	1983	1653
1271	276	52	50	1997	1981	1876	1984	1654
1272	107	82	63	1998	1982	1877	1985	1655
1273	299	112	75	1999	1983	1878	1986	1656
1274	130	143	87	1637	1984	1879	1987	1657
1275	322	173	99	1638	1985	1880	1988	1658
1276	153	203	111	1639	1986	1881	1989	1659
1277	344	234	124	1640	1987	1882	1990	1660
1278	176	264	136	1641	1988	1883	1991	1661
1279	7	294	148	1642	1989	1884	1992	1662
1280	199	325	160	1643	1990	1885	1993	1663
1281	30	355	173	1644	1991	1886	1994	1664
1282	221	25	185	1645	1992	1887	1995	1665
1283	53	56	197	1646	1993	1888	1996	1666
1284	244	86	209	1647	1994	1889	1997	1667
1285	76	116	221	1648	1995	1890	1998	1668
1286	267	147	234	1649	1996	1891	1999	1669
1287	99	177	246	1650	1997	1892	1765	1670
1288	290	207	258	1651	1998	1893	1766	1671
1289	121	238	270	1652	1999	1894	1767	1672
1290	313	268	283	1653	1645	1895	1768	1673
1291	144	298	295	1654	1646	1896	1769	1674
1292	336	329	307	1655	1647	1897	1770	1675
1293	167	359	319	1656	1648	1898	1771	1676
1294	358	30	331	1657	1649	1899	1772	1677
1295	190	60	344	1658	1650	1900	1773	1678
1296	21	90	356	1659	1651	1901	1774	1679
1297	213	121	8	1660	1652	1902	1775	1680
1298	44	151	20	1661	1653	1903	1776	1681
1299	235	181	33	1662	1654	1904	1777	1682
1300	67	212	45	1663	1655	1905	1778	1683
1301	258	242	57	1664	1656	1906	1779	1684
1302	90	12	69	1665	1657	1907	1780	1685
1303	281	303	81	1666	1658	1908	1781	1686
1304	112	333	94	1667	1659	1909	1782	1687
1305	304	3	106	1668	1660	1910	1783	1688
1306	135	34	118	1669	1661	1911	1784	1689
1307	327	64	130	1670	1662	1912	1785	1690
1308	158	94	142	1671	1663	1913	1786	1691
1309	349	125	155	1672	1664	1914	1787	1692
1310	181	155	167	1673	1665	1915	1788	1693
1311	12	185	179	1674	1666	1916	1789	1694
1312	204	216	191	1675	1667	1917	1790	1695
1313	35	246	204	1676	1668	1918	1791	1696
1314	226	277	216	1677	1669	1919	1792	1697
1315	58	307	228	1678	1670	1920	1793	1698
1316	249	337	240	1679	1671	1921	1794	1699
1317	81	8	252	1680	1672	1922	1795	1700
1318	272	38	265	1681	1673	1923	1796	1701
1319	104	68	277	1682	1674	1924	1797	1702
1320	294	99	289	1683	1675	1925	1798	1703
1321	126	129	301	1684	1676	1926	1799	1704
1322	318	159	314	1685	1677	1927	1800	1705
1323	149	190	326	1686	1678	1928	1801	1706
1324	341	220	338	1687	1679	1929	1802	1707
1325	172	250	350	1688	1680	1930	1803	1708
1326	3	281	362	1689	1681	1931	1804	1709
1327	195	311	15	1690	1682	1932	1805	1710
1328	26	341	27	1691	1683	1933	1806	1711
1329	218	12	39	1692	1684	1934	1807	1712
1330	49	42	51	1693	1685	1935	1808	1713
1331	240	72	64	1694	1686	1936	1809	1714
1332	72	103	76	1695	1687	1937	1810	1715
1333	263	133	88	1696	1688	1938	1811	1716
1334	95	163	100	1697	1689	1939	1812	1717
1335	286	194	112	1698	1690	1940	1813	1718
1336	117	224	125	1699	1691	1941	1814	1719
1337	309	254	137	1700	1692	1942	1815	1720
1338	140	285	149	1701	1693	1943	1816	1721
1339	332	315	161	1702	1694	1944	1817	1722
1340	163	346	174	1703	1695	1945	1818	1723
1341	354	16	186	1704	1696	1946	1819	1724
1342	186	46	198	1705	1697	1947	1820	1725
1343	17	77	210	1706	1698	1948	1821	1726
1344	209	107	222	1707	1699	1949	1822	1727

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont.*

Years; also year A.D. if reckoned from 1 B.C.	Mars.	Jup.	Sat.	Mars.	Merc.	Jup.	Ven.	Sat.
	Degrees.			A.D.	A.D.	A.D.	A.D.	A.D.
1345	40	137	235	1708	1700	1950	1823	1728
1346	231	168	247	1709	1701	1951	1824	1729
1347	63	198	259	1710	1702	1952	1825	1730
1348	254	227	271	1711	1703	1953	1826	1731
1349	86	259	283	1712	1704	1954	1827	1732
1350	277	289	296	1713	1705	1955	1828	1733
1351	108	319	308	1714	1706	1956	1829	1734
1352	300	350	320	1715	1707	1957	1830	1735
1353	131	20	332	1716	1708	1958	1831	1736
1354	323	50	345	1717	1709	1959	1832	1737
1355	154	81	357	1718	1710	1960	1833	1738
1356	345	111	9	1719	1711	1961	1834	1739
1357	177	141	21	1720	1712	1962	1835	1740
1358	8	172	33	1721	1713	1963	1836	1741
1359	200	202	46	1722	1714	1964	1837	1742
1360	31	232	58	1723	1715	1965	1838	1743
1361	223	263	70	1724	1716	1966	1839	1744
1362	54	293	82	1725	1717	1967	1840	1745
1363	245	324	95	1726	1718	1968	1841	1746
1364	77	354	107	1727	1719	1969	1842	1747
1365	268	24	119	1728	1720	1970	1843	1748
1366	100	55	131	1729	1721	1971	1844	1749
1367	291	85	143	1730	1722	1972	1845	1750
1368	122	115	156	1731	1723	1973	1846	1751
1369	314	146	168	1732	1724	1974	1847	1752
1370	145	176	180	1733	1725	1975	1848	1753
1371	337	206	192	1734	1726	1976	1849	1754
1372	168	237	205	1735	1727	1977	1850	1755
1373	359	267	217	1736	1728	1978	1851	1756
1374	191	297	229	1737	1729	1979	1852	1757
1375	22	328	241	1738	1730	1980	1853	1758
1376	214	358	253	1739	1731	1981	1854	1759
1377	45	28	266	1740	1732	1982	1855	1760
1378	236	59	278	1741	1733	1983	1856	1761
1379	68	89	290	1742	1734	1984	1857	1762
1380	259	119	302	1743	1735	1985	1858	1763
1381	91	150	315	1744	1736	1986	1859	1764
1382	282	180	327	1745	1737	1987	1860	1765
1383	113	210	339	1746	1738	1988	1861	1766
1384	305	241	351	1747	1739	1989	1862	1767
1385	136	271	3	1748	1740	1990	1863	1768
1386	328	302	16	1749	1741	1991	1864	1769
1387	159	332	28	1750	1742	1992	1865	1770
1388	350	2	40	1751	1743	1993	1866	1771
1389	182	33	52	1752	1744	1994	1867	1772
1390	13	63	64	1753	1745	1995	1868	1773
1391	205	93	77	1754	1746	1996	1869	1774
1392	36	124	89	1755	1747	1997	1870	1775
1393	227	154	101	1756	1748	1998	1871	1776
1394	59	184	113	1757	1749	1999	1872	1777
1395	250	215	126	1758	1750	1739	1873	1778
1396	82	245	138	1759	1751	1740	1874	1779
1397	273	15	150	1760	1752	1741	1875	1780
1398	105	306	162	1761	1753	1742	1876	1781
1399	296	336	174	1762	1754	1743	1877	1782
1400	127	6	187	1763	1755	1744	1878	1783
1401	319	37	199	1764	1756	1745	1879	1784
1402	150	67	211	1765	1757	1746	1880	1785
1403	342	97	223	1766	1758	1747	1881	1786
1404	173	128	236	1767	1759	1748	1882	1787
1405	4	158	248	1768	1760	1749	1883	1788
1406	196	188	260	1769	1761	1750	1884	1789
1407	27	219	272	1770	1762	1751	1885	1790
1408	219	249	284	1771	1763	1752	1886	1791
1409	50	280	297	1772	1764	1753	1887	1792
1410	241	310	309	1773	1765	1754	1888	1793
1411	73	340	321	1774	1766	1755	1889	1794
1412	264	11	333	1775	1767	1756	1890	1795
1413	96	41	345	1776	1768	1757	1891	1796
1414	287	71	358	1777	1769	1758	1892	1797
1415	118	102	10	1778	1770	1759	1893	1798
1416	310	132	22	1779	1771	1760	1894	1799
1417	141	162	34	1780	1772	1761	1895	1800
1418	333	193	47	1781	1773	1762	1896	1801
1419	164	223	59	1782	1774	1763	1897	1802
1420	355	253	71	1783	1775	1764	1898	1803
1421	187	284	83	1784	1776	1765	1899	1804
1422	18	314	95	1785	1777	1766	1900	1805
1423	210	344	108	1786	1778	1767	1901	1806
1424	41	15	120	1787	1779	1768	1902	1807

Years; also year A.D. if reckoned from 1 B.C.	Mars	Jup.	Sat.	Mars.	Merc.	Jup.	Ven.	Sat.
	Degrees			A.D.	A.D.	A.D.	A.D	A.D.
1425	232	45	132	1788	1780	1769	1903	1808
1426	64	75	144	1789	1781	1770	1904	1809
1427	255	106	157	1790	1782	1771	1905	1810
1428	87	136	169	1791	1783	1772	1906	1811
1429	278	166	181	1792	1784	1773	1907	1812
1430	109	197	193	1793	1785	1774	1908	1813
1431	301	227	205	1794	1786	1775	1909	1814
1432	132	257	218	1795	1787	1776	1910	1815
1433	324	288	230	1796	1788	1777	1911	1816
1434	155	318	242	1797	1789	1778	1912	1817
1435	347	349	254	1798	1790	1779	1913	1818
1436	178	19	267	1799	1791	1780	1914	1819
1437	9	49	279	1800	1792	1781	1915	1820
1438	201	80	291	1801	1793	1782	1916	1821
1439	32	110	303	1802	1794	1783	1917	1822
1440	224	140	315	1803	1795	1784	1918	1823
1441	55	171	328	1804	1796	1785	1919	1824
1442	246	201	340	1805	1797	1786	1920	1825
1443	78	230	352	1806	1798	1787	1921	1826
1444	269	262	4	1807	1799	1788	1922	1827
1445	101	292	17	1808	1800	1789	1923	1828
1446	292	322	29	1809	1801	1790	1924	1829
1447	123	353	41	1810	1802	1791	1925	1830
1448	315	23	53	1811	1803	1792	1926	1831
1449	146	53	65	1812	1804	1793	1927	1832
1450	338	84	78	1813	1805	1794	1928	1833
1451	169	114	90	1814	1806	1795	1929	1834
1452	0	144	102	1815	1807	1796	1930	1835
1453	192	175	114	1816	1808	1797	1931	1836
1454	23	205	126	1817	1809	1798	1932	1837
1455	215	235	139	1818	1810	1799	1933	1838
1456	46	266	151	1819	1811	1800	1934	1839
1457	237	296	163	1820	1812	1801	1935	1840
1458	69	327	175	1821	1813	1802	1936	1841
1459	260	357	188	1822	1814	1803	1937	1842
1460	92	27	200	1823	1815	1804	1938	1843
1461	283	58	212	1824	1816	1805	1939	1844
1462	114	88	224	1825	1817	1806	1940	1845
1463	306	118	236	1826	1818	1807	1941	1846
1464	137	149	249	1827	1819	1808	1942	1847
1465	329	179	261	1828	1820	1809	1943	1848
1466	160	209	273	1829	1821	1810	1944	1849
1467	351	240	285	1830	1822	1811	1945	1850
1468	183	270	298	1831	1823	1812	1946	1851
1469	14	300	310	1832	1824	1813	1947	1852
1470	206	331	322	1833	1825	1814	1948	1853
1471	37	1	334	1834	1826	1815	1949	1854
1472	229	31	346	1835	1827	1816	1950	1855
1473	60	62	359	1836	1828	1817	1951	1856
1474	251	92	11	1837	1829	1818	1952	1857
1475	83	122	23	1838	1830	1819	1953	1858
1476	274	153	35	1839	1831	1820	1954	1859
1477	106	183	48	1840	1832	1821	1955	1860
1478	296	213	60	1841	1833	1822	1956	1861
1479	128	244	72	1842	1834	1823	1957	1862
1480	320	274	84	1843	1835	1824	1958	1863
1481	151	305	96	1844	1836	1825	1959	1864
1482	343	335	109	1845	1837	1826	1960	1865
1483	174	5	121	1846	1838	1827	1961	1866
1484	5	36	133	1847	1839	1828	1962	1867
1485	196	66	145	1848	1840	1829	1963	1868
1486	28	96	157	1849	1841	1830	1964	1869
1487	220	127	170	1850	1842	1831	1965	1870
1488	51	157	182	1851	1843	1832	1966	1871
1489	242	187	194	1852	1844	1833	1967	1872
1490	74	218	206	1853	1845	1834	1968	1873
1491	265	248	219	1854	1846	1835	1969	1874
1492	97	18	231	1855	1847	1836	1970	1875
1493	288	309	243	1856	1848	1837	1971	1876
1494	119	339	255	1857	1849	1838	1972	1877
1495	311	9	267	1858	1850	1839	1973	1878
1496	142	40	280	1859	1851	1840	1974	1879
1497	334	70	292	1860	1852	1841	1975	1880
1498	165	100	304	1861	1853	1842	1976	1881
1499	356	131	316	1862	1854	1842	1977	1882
1500	188	161	329	1863	1855	1844	1978	1883
1501	19	191	341	1864	1856	1845	1979	1884
1502	211	222	353	1865	1857	1846	1980	1885
1503	42	252	5	1866	1858	1847	1981	1886
1504	223	283	17	1867	1859	1848	1982	1887

TABLE V-A—*cont.*

Yearly increase of mean longitude, etc.—*cont.*

Years; also year A.D. if reckoned from 1 B.C.	Mars	Jup	Sat	Mars	Merc	Jup	Ven	Sat
	Degrees.			A.D.	A.D.	A.D.	A.D.	A.D.
1505	65	313	30	1868	1860	1849	1983	1888
1506	254	343	42	1869	1861	1850	1984	1889
1507	88	14	54	1870	1862	1851	1985	1890
1508	279	44	66	1871	1863	1852	1986	1891
1509	111	74	79	1872	1864	1853	1987	1892
1510	302	105	91	1873	1865	1854	1988	1893
1511	133	135	103	1874	1866	1855	1989	1894
1512	325	165	115	1875	1867	1856	1990	1895
1513	156	196	127	1876	1868	1857	1991	1896
1514	348	226	140	1877	1869	1858	1992	1897
1515	179	256	152	1878	1870	1859	1993	1898
1516	10	287	164	1879	1871	1860	1994	1899
1517	202	317	176	1880	1872	1861	1995	1900
1518	33	347	188	1881	1873	1862	1996	1901
1519	225	18	201	1882	1874	1863	1997	1902
1520	56	48	213	1883	1875	1864	1998	1903
1521	247	78	225	1884	1876	1865	1999	1904
1522	79	109	237	1885	1877	1866	1992	1905
1523	270	139	250	1886	1878	1867	1993	1906
1524	102	169	262	1887	1879	1868	1994	1907
1525	293	200	274	1888	1880	1869	1995	1908
1526	124	230	286	1889	1881	1870	1996	1909
1527	316	261	298	1890	1882	1871	1997	1910
1528	147	291	311	1891	1883	1872	1998	1911
1529	339	321	323	1892	1884	1873	1999	1912
1530	170	352	335	1893	1885	1874	1765	1913
1531	1	22	347	1894	1886	1875	1766	1914
1532	193	52	0	1895	1887	1876	1767	1915
1533	24	83	12	1896	1888	1877	1768	1916
1534	216	113	24	1897	1889	1878	1769	1917
1535	47	143	36	1898	1890	1879	1770	1918
1536	238	174	48	1899	1891	1880	1771	1919
1537	70	204	61	1900	1892	1881	1772	1920
1538	261	233	73	1901	1893	1882	1773	1921
1539	93	265	85	1902	1894	1883	1774	1922
1540	284	295	97	1903	1895	1884	1775	1923
1541	115	325	110	1904	1896	1885	1776	1924
1542	307	356	122	1905	1897	1886	1777	1925
1543	138	26	134	1906	1898	1887	1778	1926
1544	330	56	146	1907	1899	1888	1779	1927
1545	161	87	158	1908	1900	1889	1780	1928
1546	353	117	171	1909	1901	1890	1781	1929
1547	184	147	183	1910	1902	1891	1782	1930
1548	15	178	195	1911	1903	1892	1783	1931
1549	207	208	207	1912	1904	1893	1784	1932
1550	38	239	220	1913	1905	1894	1785	1933
1551	230	269	232	1914	1906	1895	1786	1934
1552	61	299	244	1915	1907	1896	1787	1935
1553	252	330	256	1916	1908	1897	1788	1936
1554	84	0	268	1917	1909	1898	1789	1937
1555	275	30	281	1918	1910	1899	1790	1938
1556	107	61	293	1919	1911	1900	1791	1939
1557	297	91	305	1920	1912	1901	1792	1940
1558	129	121	317	1921	1913	1902	1793	1941
1559	321	152	329	1922	1914	1903	1794	1942
1560	152	182	342	1923	1915	1904	1795	1943
1561	344	212	354	1924	1916	1905	1796	1944
1562	175	243	6	1925	1917	1906	1797	1945
1563	6	273	18	1926	1918	1907	1798	1946
1564	198	303	31	1927	1919	1908	1799	1947
1565	29	334	43	1928	1920	1909	1800	1948
1566	221	4	55	1929	1921	1910	1801	1949
1567	52	34	67	1930	1922	1911	1802	1950
1568	243	65	79	1931	1923	1912	1803	1951
1569	75	95	92	1932	1924	1913	1804	1952
1570	266	125	104	1933	1925	1914	1805	1953
1571	98	156	116	1934	1926	1915	1806	1954
1572	289	186	128	1935	1927	1916	1807	1955
1573	120	216	141	1936	1928	1917	1808	1956
1574	312	247	153	1937	1929	1918	1809	1957
1575	143	277	165	1938	1930	1919	1810	1958
1576	335	308	177	1939	1931	1920	1811	1959
1577	166	338	189	1940	1932	1921	1812	1960
1578	357	8	202	1941	1933	1922	1813	1961
1579	189	39	214	1942	1934	1923	1814	1962

Years, also year A.D. if reckoned from 1 B.C.	Mars	Jup.	Sat	Mars	Merc.	Jup	Ven.	Sat.
	Degrees.			A.D.	A.D.	A.D.	A.D.	A.D.
1580	20	69	226	1943	1935	1924	1815	1963
1581	212	99	238	1944	1936	1925	1816	1964
1582	43	130	251	1945	1937	1926	1817	1965
1583	234	160	263	1946	1938	1927	1818	1966
1584	66	190	275	1947	1939	1928	1819	1967
1585	257	221	287	1948	1940	1929	1820	1968
1586	89	251	299	1949	1941	1930	1821	1969
1587	280	21	312	1950	1942	1931	1822	1970
1588	112	312	324	1951	1943	1932	1823	1971
1589	303	342	336	1952	1944	1933	1824	1972
1590	134	12	348	1953	1945	1934	1825	1973
1591	326	43	1	1954	1946	1935	1826	1974
1592	157	73	13	1955	1947	1936	1827	1975
1593	349	103	25	1956	1948	1937	1828	1976
1594	180	134	37	1957	1949	1938	1829	1977
1595	11	164	49	1958	1950	1939	1830	1978
1596	203	194	62	1959	1951	1940	1831	1979
1597	34	225	74	1960	1952	1941	1832	1980
1598	226	255	86	1961	1953	1942	1833	1981
1599	57	286	98	1962	1954	1943	1834	1982
1600	248	316	110	1963	1955	1944	1835	1983
1601	80	346	123	1964	1956	1945	1836	1984
1602	271	17	135	1965	1957	1946	1837	1985
1603	103	47	147	1966	1958	1947	1838	1986
1604	294	77	159	1967	1959	1948	1839	1987
1605	125	108	172	1968	1960	1949	1840	1988
1606	317	138	184	1969	1961	1950	1841	1989
1607	148	168	196	1970	1962	1951	1842	1990
1608	340	199	208	1971	1963	1952	1843	1991
1609	171	229	220	1972	1964	1953	1844	1992
1610	2	259	233	1973	1965	1954	1845	1993
1611	194	290	245	1974	1966	1955	1846	1994
1612	25	320	257	1975	1967	1956	1847	1995
1613	217	350	269	1976	1968	1957	1848	1996
1614	48	21	282	1977	1969	1958	1849	1997
1615	239	51	294	1978	1970	1959	1850	1998
1616	71	81	306	1979	1971	1960	1851	1999
1617	262	112	318	1980	1972	1961	1852	
1618	94	142	330	1981	1973	1962	1853	
1619	285	172	343	1982	1974	1963	1854	
1620	117	203	355	1983	1975	1964	1855	
1621	308	233	7	1984	1976	1965	1856	
1622	139	264	19	1985	1977	1966	1857	
1623	331	294	32	1986	1978	1967	1858	
1624	162	324	44	1987	1979	1968	1859	
1625	354	355	56	1988	1980	1969	1860	
1626	185	25	68	1989	1981	1970	1861	
1627	16	55	80	1990	1982	1971	1862	
1628	208	86	93	1991	1983	1972	1863	
1629	39	116	105	1992	1984	1973	1864	
1630	231	146	117	1993	1985	1974	1865	
1631	62	177	129	1994	1986	1975	1866	
1632	253	207	141	1995	1987	1976	1867	
1633	84	336	154	1996	1988	1977	1868	
1634	276	268	166	1997	1989	1978	1869	
1635	108	298	178	1998	1990	1979	1870	
1636	298	328	190	1999	1991	1980	1871	
1637	130	359	203		1992	1981	1872	
1638	322	29	215		1993	1982	1873	
1639	153	59	227		1994	1983	1874	
1640	345	90	239		1995	1984	1875	
1641	176	120	251		1996	1985	1876	
1642	7	150	264		1997	1986	1877	
1643	199	181	276		1998	1987	1878	
1644	30	211	288	See Table V-B	1999	1988	1879	
1645	222	241	300			1989	1880	
1646	53	272	333		See Table V-B.	1990	1881	
1647	244	302	325			1991	1882	
1648	76	333	337			1992	1883	
1649	267	3	349			1993	1884	
1650	99	33	1			1994	1885	
1651	290	64	14			1995	1886	
1652	121	94	26			1996	1887	
1653	313	124	38			1997	1888	
1654	144	155	50			1998	1889	
1655	336	185	63			1999	1890	

Saturn's actual geocentric places for these years are given in Table V-B.

TABLE V A.—*cont.*

Yearly increase of mean longitude, etc.—*cont.*

Years; also year A.D. if reckoned from 1 B.C.	Mars.	Jup.	Sat.	Venus.	Years; also year A.D. if reckoned from 1 B.C.	Mars.	Jup.	Sat.	Venus.	Years; also year A.D. if reckoned from 1 B.C.	Mars.	Jup.	Sat.	Venus.	Years; also year A.D. if reckoned from 1 B.C.	Mars.	Jup.	Sat.	Venus.
	Degrees.					Degrees.					Degrees					Degrees			
1656	167	215	75	1891	**1684**	126	345	57	1919	**1712**	86	115	39	1947	**1740**	45	244	21	1975
1657	358	246	87	1892	**1685**	318	15	69	1920	**1713**	277	145	51	1948	**1741**	237	275	33	1976
1658	190	276	99	1893	**1686**	149	46	81	1921	**1714**	109	175	63	1949	**1742**	68	305	46	1977
1659	21	306	111	1894	**1687**	341	76	94	1922	**1715**	299	206	76	1950	**1743**	259	336	58	1978
1660	213	337	124	1895	**1688**	172	106	106	1923	**1716**	131	236	88	1951	**1744**	91	6	70	1979
1661	44	7	136	1896	**1689**	3	137	118	1924	**1717**	323	267	100	1952	**1745**	282	36	82	1980
1662	236	37	148	1897	**1690**	195	167	130	1925	**1718**	154	297	112	1953	**1746**	114	67	94	1981
1663	67	68	160	1898	**1691**	26	197	142	1926	**1719**	346	327	125	1954	**1747**	305	97	107	1982
1664	258	98	172	1899	**1692**	218	228	155	1927	**1720**	177	358	137	1955	**1748**	136	127	119	1983
1665	90	128	185	1900	**1693**	49	258	167	1928	**1721**	8	28	149	1956	**1749**	328	158	131	1984
1666	281	159	197	1901	**1694**	240	289	179	1929	**1722**	200	58	161	1957	**1750**	159	188	143	1985
1667	113	189	209	1902	**1695**	72	319	191	1930	**1723**	31	89	173	1958	**1751**	351	218	156	1986
1668	304	219	221	1903	**1696**	263	349	203	1931	**1724**	223	119	186	1959	**1752**	182	249	168	1987
1669	135	250	234	1904	**1697**	95	20	216	1932	**1725**	54	149	198	1960	**1753**	13	279	180	1988
1670	327	280	246	1905	**1698**	286	50	228	1933	**1726**	245	180	210	1961	**1754**	205	309	192	1989
1671	158	311	258	1906	**1699**	118	80	240	1934	**1727**	77	210	222	1962	**1755**	36	340	204	1990
1672	350	341	270	1907	**1700**	309	111	252	1935	**1728**	268	240	235	1963	**1756**	228	10	217	1991
1673	181	11	282	1908	**1701**	140	141	265	1936	**1729**	100	271	247	1964	**1757**	59	40	229	1992
1674	12	42	295	1909	**1702**	332	171	277	1937	**1730**	291	301	259	1965	**1758**	250	71	241	1993
1675	204	72	307	1910	**1703**	163	202	289	1938	**1731**	122	331	271	1966	**1759**	82	101	253	1994
1676	35	102	319	1911	**1704**	355	232	301	1939	**1732**	314	2	283	1967	**1760**	273	131	266	1995
1677	227	133	331	1912	**1705**	186	262	313	1940	**1733**	145	32	296	1968	**1761**	105	162	278	1996
1678	58	163	344	1913	**1706**	17	293	326	1941	**1734**	337	62	308	1969	**1762**	296	192	290	1997
1679	249	193	356	1914	**1707**	209	323	338	1942	**1735**	168	93	320	1970	**1763**	127	222	302	1998
1680	81	224	8	1915	**1708**	40	353	350	1943	**1736**	0	123	332	1971	**1764**	319	253	314	1999
1681	272	254	20	1916	**1709**	232	24	2	1944	**1737**	191	153	344	1972	**1765**	150	283	327	...
1682	104	284	32	1917	**1710**	63	54	15	1945	**1738**	22	184	357	1973	**1766**	342	314	339	..
1683	295	315	45	1918	**1711**	254	84	27	1946	**1739**	214	214	9	1974					

Years, also year A.D. if reckoned from 1 B.C.	Mars	Jup.	Sat.	Years; also year A.D. if reckoned from 1 B.C.	Mars.	Jup.	Sat.	Years; also year A.D. if reckoned from 1 B.C.	Mars.	Jup.	Sat.	Years also year A.D. if reckoned from 1 B.C.	Mars.	Jup	Sat	Years; also year A.D. if reckoned from 1 B.C.	Mars.	Jup.	Sat.
	Degrees.				Degrees.				Degrees.				Degrees				Degrees.		
1767	173	344	351	**1815**	0	1	218	**1863**	188	17	84	**1911**	15	34	311	**1959**	203	51	177
1768	4	14	3	**1816**	192	31	230	**1864**	19	48	96	**1912**	207	64	323	**1960**	34	81	189
1769	196	45	15	**1817**	23	61	242	**1865**	211	78	109	**1913**	38	95	335	**1961**	226	111	202
1770	27	75	28	**1818**	215	92	254	**1866**	42	108	121	**1914**	230	125	347	**1962**	57	142	214
1771	219	105	39	**1819**	46	122	266	**1867**	234	139	133	**1915**	61	155	359	**1963**	248	172	226
1772	50	136	52	**1820**	238	152	279	**1868**	65	169	145	**1916**	252	186	12	**1964**	80	202	238
1773	241	166	64	**1821**	69	183	291	**1869**	256	199	157	**1917**	84	216	24	**1965**	271	233	250
1774	73	196	77	**1822**	260	213	303	**1870**	88	230	170	**1918**	275	246	36	**1966**	103	263	263
1775	264	227	89	**1823**	92	342	315	**1871**	279	260	182	**1919**	107	277	48	**1967**	294	293	275
1776	96	257	101	**1824**	283	274	328	**1872**	111	290	194	**1920**	298	307	61	**1968**	126	324	287
1777	287	287	113	**1825**	115	304	340	**1873**	301	321	206	**1921**	129	337	73	**1969**	317	354	299
1778	119	318	125	**1826**	306	334	352	**1874**	133	351	218	**1922**	321	8	85	**1970**	148	24	312
1779	310	348	138	**1827**	137	5	4	**1875**	325	21	231	**1923**	152	38	97	**1971**	340	55	324
1780	141	18	150	**1828**	329	35	16	**1876**	156	52	243	**1924**	344	68	109	**1972**	171	85	336
1781	333	49	162	**1829**	160	65	29	**1877**	348	82	255	**1925**	175	99	122	**1973**	3	115	348
1782	164	79	174	**1830**	352	96	41	**1878**	179	112	267	**1926**	6	129	134	**1974**	194	146	0
1783	356	109	187	**1831**	183	126	53	**1879**	10	143	280	**1927**	198	159	146	**1975**	25	176	13
1784	187	140	199	**1832**	14	156	65	**1880**	202	173	292	**1928**	29	190	158	**1976**	217	207	25
1785	18	170	211	**1833**	206	187	78	**1881**	33	203	304	**1929**	221	220	171	**1977**	48	237	37
1786	210	200	223	**1834**	37	217	90	**1882**	225	234	316	**1930**	52	251	183	**1978**	240	267	49
1787	41	231	235	**1835**	229	248	102	**1883**	56	264	328	**1931**	244	281	195	**1979**	71	298	61
1788	233	261	248	**1836**	60	278	114	**1884**	247	295	341	**1932**	75	311	207	**1980**	262	328	74
1789	64	292	260	**1837**	251	308	126	**1885**	79	325	353	**1933**	266	342	219	**1981**	94	358	86
1790	255	322	272	**1838**	83	339	139	**1886**	270	355	5	**1934**	98	12	232	**1982**	285	28	98
1791	87	352	284	**1839**	274	9	151	**1887**	102	26	17	**1935**	289	42	244	**1983**	117	59	110
1792	278	23	297	**1840**	106	39	163	**1888**	293	56	30	**1936**	121	73	256	**1984**	308	89	123
1793	110	53	309	**1841**	297	70	175	**1889**	124	86	42	**1937**	312	103	268	**1985**	139	120	135
1794	300	83	321	**1842**	128	100	187	**1890**	316	117	54	**1938**	143	133	280	**1986**	331	150	147
1795	132	114	333	**1843**	320	130	200	**1891**	147	147	66	**1939**	335	164	293	**1987**	162	180	159
1796	324	144	345	**1844**	151	161	212	**1892**	339	177	78	**1940**	166	194	305	**1988**	354	211	171
1797	155	174	358	**1845**	343	191	224	**1893**	170	208	91	**1941**	358	224	317	**1989**	185	241	184
1798	347	205	10	**1846**	174	221	236	**1894**	2	238	103	**1942**	189	255	329	**1990**	16	271	196
1799	178	235	22	**1847**	5	252	249	**1895**	193	268	114	**1943**	20	285	342	**1991**	208	302	208
1800	9	265	34	**1848**	197	282	261	**1896**	24	299	127	**1944**	212	315	354	**1992**	39	332	220
1801	201	296	47	**1849**	28	312	273	**1897**	216	329	140	**1945**	43	346	6	**1993**	231	2	233
1802	32	326	59	**1850**	220	343	285	**1898**	47	359	152	**1946**	235	16	18	**1994**	63	33	245
1803	224	356	71	**1851**	51	13	297	**1899**	239	30	164	**1947**	66	46	30	**1995**	253	63	257
1804	55	27	83	**1852**	243	43	310	**1900**	70	60	176	**1948**	257	77	43	**1996**	85	93	269
1805	246	57	95	**1853**	74	74	322	**1901**	261	90	188	**1949**	89	107	55	**1997**	276	124	281
1806	78	87	108	**1854**	265	104	334	**1902**	93	121	201	**1950**	280	137	67	**1998**	108	154	294
1807	269	118	120	**1855**	97	134	346	**1903**	284	151	213	**1951**	112	168	79	**1999**	299	184	306
1808	101	148	132	**1856**	288	165	359	**1904**	116	181	225	**1952**	302	198	92	**2000**	130	215	318
1809	292	178	144	**1857**	120	195	11.	**1905**	307	212	237	**1953**	134	229	104	**2001**	322	245	330
1810	123	209	156	**1858**	311	225	23	**1906**	138	242	249	**1954**	326	259	115	**2002**	153	276	343
1811	315	239	169	**1859**	142	256	35	**1907**	330	273	262	**1955**	157	289	128	**2003**	345	306	355
1812	146	270	181	**1860**	334	286	47	**1908**	161	303	274	**1956**	349	320	140	**2004**	176	336	7
1813	338	300	193	**1861**	165	317	60	**1909**	353	333	286	**1957**	180	350	153	**2005**	8	7	19
1814	169	313	205	**1862**	357	347	72	**1910**	184	4	298	**1958**	11	20	165				

TABLE V-B.

Geocentric Places of Planets.

Introductory Note.

Table V-B is the second part of the Perpetual Planetary Almanac. It gives the actual geocentric places of each of the five planets Mars, Mercury, Jupiter, Venus and Saturn for every tenth day in the current cycle, which is three hundred and sixty-three years for Mars (A.D. 1637 to A.D. 1999), three hundred and fifty-five years for Mercury (A D. 1645 to A.D. 1999), three hundred and forty-four years for Jupiter (A.D. 1656 to A.D. 1999), two hundred and thirty-five years for Venus (A.D. 1765 to A.D. 1999), and three hundred and eighty three years for Saturn (A D. 1617 to A.D. 1999). The corresponding dates by the European calendar are given throughout and by means of these dates the tithi, nakshatra, solar month and day of month, and Muhammadan date can be found from the body of the Ephemeris. It has been shown in section iii of Chapter V of this work, pages 110, etc., that, given the actual movements of any planet for one cycle as above, its place at any moment on any day, past or future, can be ascertained very accurately with the help of Table V-A, or for very remote periods, with the help of the millennial cycles indicated in the explanatory note to Table V-A. Actual examples will be found on pages 118, 119, 123, 124 (section iii of Chapter V), showing how to use Tables V-A and V-B for the calculation of ancient positions of planets, such as those required for the Chinese Era *circa* 2500 B.C., for Rama's horoscope, and for the birth of Christ (according to Kepler), or of conjunctions of planets noticed in more modern times, e. g., the conjunction on 15th September, A.D. 1186.

2. For the years A.D. 1617 to A.D. 1636 inclusive, Table V-B gives the positions of Saturn alone, because the positions of the other planets in any of these years can be found from Table V-A which gives the corresponding year in the current cycle; or they may be found directly by applying a suitable cycle of recurrence. For instance, the successive positions of Mars in A.D. 1620 were, by Table V-A, practically the same as his positions in A.D. 1983 (= A.D. 1620 + 363).

For the years A.D. 1637 to 1644, Table V-B gives the positions of Mars and Saturn alone, and the position of any other planet can be found by applying a suitable cycle of recurrence. For instance, the successive positions of Jupiter in A.D. 1640 were the same as those in A.D. 1984 (=A.D. 1640 + 344).

From A.D. 1656 to A.D. 1764, the Table V-B gives the positions of all the planets except Venus because Venus' cycle is two hundred and thirty-five years and for any year before A.D. 1765 inclusive, Venus' positions can be found from Table V-A. Thus Venus' positions in A.D. 1700 were the same as her positions in A.D. 1935 (=A.D. 1700 + 235), which are given in Table V-B.

For the years A.D. 1765 to A.D. 1999, both inclusive, Table V-B gives the successive positions of all the five planets for every ten days in the year with the corresponding dates of the European calendar.

3. In applying any cycle of recurrence to any planetary position recorded in this Table, care should be taken to see that the day of the Indian solar year is not varied. For instance, suppose we want to find the position of Mercury on 1st January 2500 B.C, we should first of all find out what day of the Indian solar year corresponded to 1st January 2500 B.C. We know from the Eye-table, section **k**, that in 2501 B.C. the Indian solar year began on February 21·09: and from Eye-table, section **q**, that 1st January of 2500 B.C. was the 307th day reckoned from 1st March, 2501 B.C., or the 336th day reckoned from 1st February, 2501 B.C. (remembering that 2501 B.C. was a leap year). Reckoned from 21st February the 1st January 2500 B.C. was therefore the 316th complete day (= 336−20). Now, to find the year in Table V-B when Mercury had the same successive positions as in 2500 B.C. (or A.D. *minus* 2499), we apply one of the major cycles given at the beginning of Table V-A and proceed thus: 4214 years *minus* 2499 = A.D. 1715. Mercury, on 1st January 2500 B.C., had the same place as on the 316th complete day of the Indian solar year A.D. 1715−16, i.e., by Table V-B) 321·8°.

4. It will not do in this case to take Mercury's position on 1st January, A.D. 1715 according to Table V-B because though the successive positions of Mercury in 2501 B.C. were practically the same as his positions in A.D. 1715 16, still 1st January 2500 B.C. was a different day in the Indian solar year 2501 B.C. being then the 316th complete day, as we have seen, from what it was in A.D. 1715–16, when, as we may see from Table V-B, it was the 278th complete day.

5. Table V-B gives the planetary positions for every tenth complete day in each Indian solar year. For intermediate days proportional parts should be taken. For instance, in the example last given, we required to know the place of Mercury on the 316th complete day of the Indian solar year A.D. 1715. Table V-B gives the following places :—

A.D. 1715–16·310th complete day. Place of Mercury 312·3°
„ 320th „ „ 328·2°

Difference : 15·9°

For 10 days Mercury's place advances by 15·9°
∴ For 1 day „ „ 1·59°
∴ For 6 days „ „ 6 × 1·59°
= 9·54° or 9·5° nearly.

We conclude that Mercury's place for 316 complete days of Indian solar year A.D. 1715–16 was 312·3 + 9·5 = 321·8°.

6. Table V-B gives the places of planets on 0 day, on 10th complete day, on 20th complete day, etc. The 0 day is always the day of commencement of the Indian solar year which is marked (1) in the head lines of the body of the Ephemeris for every year from A.D. 700 to A.D. 1950 by Ārya as well as by Sūrya Siddhānta; (2) in Table II for every year from A.D. 0 to A.D. 2000 by Sūrya Siddhānta; and (3) for all Siddhāntas in their respective Eye-tables, sections **k** and **n**.

7. Taking again the last example, the 0 day of A.D. 1715 was by Table II or by "Ephemeris, Vol. VII," March 29·75. The 10th complete day would be March 39·75, i.e., April 8·75; the 20th complete day, April 18·75; and so on. The 316th complete day of A.D. 1715 was by Table V-B (vide entries against A.D. 1715), 2nd February + 6·75 = February 8·75; whereas the 316th complete day of 2500 B.C. was January 1·09, because the year 2501 B.C. began on February 21·09 (see paragraph 3 *supra*). We conclude that the position of Mercury on January 1·09, 2500 B.C. (i.e., at two hours after mean sunrise on 1st January 2500 B.C.) was the same as its position on February 7·75, i.e., at midnight between February 7 and February 8, A.D. 1716. The position was, as we have found already, 321·8°.

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle.

Venus, A.D. 1765—A.D. 1999;

Day of I.S.Y.		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
Eng. date.*		Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
Sat.	1617	22·0	23·3	24·6	26·0	27·3	28·6	30·0	31·2	32·4	33·5	34·4	35·2	35·9	36·2	36·5	36·9	36·6	36·4
	1618	34·4	35·7	37·0	38·4	39·7	41·0	42·4	43·7	45·0	46·2	47·3	48·4	49·6	50·1	50·5	51·0	51·1	51·0
	1619	47·3	48·7	49·9	51·1	52·4	53·7	55·0	56·3	57·7	59·0	60·3	61·4	62·7	63·4	64·3	65·1	65·4	65·8
	1620	60·5	61·5	62·7	63·7	65·0	66·3	67·6	68·9	70·3	71·7	73·0	74·3	75·5	76·5	77·5	78·5	79·1	79·6
	1621	73·8	74·7	75·6	76·5	77·6	78·9	80·1	81·4	82·8	84·1	85·4	86·7	88·2	89·2	90·3	91·5	92·4	93·2
	1622	87·3	88·0	88·7	89·3	90·4	91·4	92·6	93·7	95·1	96·3	97·7	98·9	100·3	101·6	102·9	104·1	105·1	106·2
	1623	101·1	101·5	101·9	102·3	103·1	104·0	104·9	106·0	107·2	108·5	109·7	111·0	112·3	113·6	114·9	116·2	117·3	118·4
	1624	115·0	115·1	115·2	115·3	116·0	116·7	117·3	118·4	119·4	120·4	121·7	123·0	124·2	125·5	126·8	128·1	129·3	130·5
	1625	128·9	128·7	128·5	128·4	128·8	129·1	129·6	130·5	131·4	132·2	133·4	134·5	134·7	137·0	138·4	139·5	140·7	142·0
	1626	142·6	142·2	141·8	141·5	141·6	141·8	141·9	142·6	143·3	143·9	144·9	145·9	147·0	148·2	149·4	150·7	152·0	153·3
	1627	156·2	155·6	155·0	154·4	154·2	154·2	154·1	154·6	155·0	155·4	156·3	157·2	158·1	159·2	160·3	161·4	162·7	164·0
	1628	169·4	168·7	168·0	167·3	167·0	166·7	166·4	166·6	166·8	166·9	167·7	168·5	169·2	170·2	171·3	172·3	173·5	174·7
	1629	182·3	181·5	180·7	180·0	179·5	179·0	178·5	178·5	178·5	178·4	178·9	179·4	180·0	180·9	181·8	182·7	183·8	185·0
	1630	194·9	194·1	193·3	192·5	191·9	191·3	190·6	190·4	190·2	189·8	190·2	190·5	190·8	191·6	192·4	193·1	194·2	195·2
Eng. date.		Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
	1631	207·1	206·3	205·5	204·8	204·1	203·1	202·6	202·2	201·8	201·4	201·4	201·5	201·7	202·3	202·9	203·4	204·3	205·2
Eng. date.		Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
	1632	218·9	218·2	217·5	216·8	216·0	215·2	214·5	213·9	213·3	212·8	212·6	212·6	212·5	212·9	213·3	213·8	214·6	215·5
	1633	230·4	229·9	229·3	228·7	227·9	227·1	226·4	225·7	225·0	224·0	224·0	223·7	223·5	223·7	223·9	224·2	224·9	225·5
	1634	241·8	241·4	241·0	240·6	239·9	239·2	238·4	236·6	236·9	236·1	235·6	235·1	234·7	234·7	234·8	234·8	235·4	235·9
Eng. date.		Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
	1635	252·7	252·5	252·3	252·1	251·4	250·8	250·2	249·5	248·7	247·9	247·3	246·6	246·0	245·8	245·7	245·6	246·0	246·4
Eng. date.		Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
	1636	263·9	263·8	263·7	263·7	263·2	262·7	262·1	261·3	260·5	259·8	259·1	258·4	257·7	257·4	257·0	256·6	256·8	257·0
1637	Mars ..	21·4	28·6	35·7	42·8	49·7	56·6	63·4	70·1	76·9	83·4	90·1	96·5	103·0	109·5	115·9	122·2	128·5	134·7
	Sat. ...	274·6	274·8	275·0	275·2	274·8	274·5	274·3	273·4	272·6	271·9	271·2	270·5	269·7	269·2	268·7	268·1	268·0	268·1
1638	Mars ...	240·5	243·1	244·5	245·1	244·9	243·5	240·4	238·2	235·9	234·5	234·1	234·9	237·5	240·6	244·8	249·5	254·9	260·4
	Sat ..	285·5	285·8	286·1	286·6	286·4	286·2	286·1	285·5	284·9	284·3	283·5	282·7	282·0	281·3	280·6	280·0	279·8	279·6
Eng. date. ...		Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1639	Mars	36·1	42·8	49·6	56·3	63·0	69·7	76·2	82·8	89·2	95·8	102·3	108·5	115·1	121·4	127·8	134·1	140·5	146·9
	Sat.	296·3	296·9	297·5	298·0	298·1	298·2	298·3	297·8	297·3	296·9	296·1	295·4	295·6	293·8	293·1	292·4	292·0	291·6
Eng. date .		Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1640	Mars ..	270·2	276·1	281·9	287·6	292·9	298·1	302·5	306·6	309·9	312·4	313·8	313·3	312·2	309·9	307·4	305·4	304·7	304·9
	Sat. ...	307·3	308·0	308·7	309·5	309·9	310·2	310·4	310·1	309·8	309·6	309·0	308·4	307·7	306·9	306·1	305·2	304·6	304·1
1641	Mars ..	50·7	57·1	63·5	69·9	76·1	82·5	88·9	95·0	101·5	107·9	114·2	120·6	126·6	133·3	139·7	145·9	152·4	158·7
	Sat. ...	318·8	319·2	320·1	321·1	321·6	322·2	322·7	322·6	322·5	322·5	322·0	321·5	321·0	320·2	319·4	318·6	317·9	317·2
1642	Mars ...	291·8	299·0	306·1	313·4	320·5	327·4	334·4	341·0	347·6	353·9	359·8	5·4	10·6	15·3	19·2	22·3	23·9	24·5
	Sat. ..	329·4	330·5	331·6	332·7	333·4	334·1	334·8	335·0	335·3	335·5	335·2	334·9	334·5	333·8	334·0	332·3	331·5	330·7
Eng. date. ..		Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1643	Mars ...	65·7	71·6	77·4	83·3	89·4	95·4	101·5	107·6	113·7	119·9	126·3	132·4	138·9	145·1	151·6	158·1	164·4	171·1
	Sat.	340·7	341·9	343·1	344·3	345·2	346·1	347·1	347·6	348·2	348·6	348·5	348·4	348·3	347·7	347·2	346·6	345·8	345·0
Eng. date.		Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1644	Mars ..	310·7	318·5	326·0	333·7	341·2	348·8	355·9	3·3	10·7	17·6	24·5	31·2	37·5	43·7	49·7	55·2	59·6	65·1
	Sat .	352·4	353·7	355·0	356·3	357·4	358·5	359·5	0·2	0·9	1·7	1·9	2·1	2·2	1·8	1·5	1·1	0·3	359·5
1645	Mars ...	82·1	87·2	92·3	97·7	103·2	108·8	114·7	120·5	126·5	132·5	138·7	144·9	151·2	157·6	164·0	170·4	176·9	183·6
	Merc ..	338·1	356·8	14·3	33·4	51·8	68·3	80·6	85·8	80·9	74·9	78·5	89·9	105·2	122·8	140·8	158·8	175·4	189·5
	Sat. ...	4·3	5·6	6·9	8·2	9·4	10·6	11·8	12·7	13·6	14·6	15·1	15·5	16·0	15·9	15·8	15·7	15·1	14·5
1646	Mars	328·2	336·0	343·7	351·4	359·0	6·6	14·0	21·3	28·6	35·8	42·7	49·5	56·1	62·7	69·1	75·1	81·2	86·9
	Merc. ...	351·9	10·8	29·1	46·1	59·8	66·2	63·5	56·6	58·2	69·0	83·5	100·8	119·1	137·6	154·5	169·7	180·7	183·1
	Sat.	16·4	17·7	19·0	20·4	21·7	23·0	24·3	25·4	26·5	27·6	28·3	29·0	29·7	29·9	30·2	30·3	29·9	29·5
Eng. date. ...		Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1647	Mars ...	102·4	105·6	109·5	113·9	118·5	123·7	129·4	134·6	140·2	145·9	152·1	158·0	164·4	170·6	177·1	183·6	190·3	197·2
	Merc. ...	6·4	23·6	38·0	46·3	45·4	38·2	37·9	46·8	61·3	78·6	97·1	115·4	133·4	149·3	161·6	166·9	162·8	156·0
	Sat. ...	28·7	30·0	31·3	32·5	33·9	35·3	36·7	37·9	39·1	40·4	41·4	42·3	43·2	43·6	44·0	44·5	44·5	44·4

Mesh	Vrsh.	Mith.	Kat.	Sim.	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

* Note that citations in European writers between 5th October A.D. 1582 and 13th September A.D. 1752 may differ by 10 or 11 days Russia, the **NEW STYLE** was introduced in A D 1582 by a bull of Pope Gregory XIII, by which the day following 4th October 1582, was declared Great Britain and its dependencies by an Act of Parliament in A.D. 1752 which declared the day following 2 September A.D. 1752 to be the work gives only English dates, but the reader will remember that, e.g., a continental writer citing 15 October A.D. 1582 has in view the day

V-B.

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999.

180	190	200	210	220	230	240	250	260	270		280	290	300	310	320	330	340	350	360
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
35·9	35·3	34·6	33 8	33 0	32 2	31 3	30 7	30 1	29 5	**1618**	29·5	29 4	29 8	29 9	30 4	30 9	31·9	32 8	33·8
51·0	50·4	49·9	49·4	48 6	47·8	46·9	46 2	45 4	44·6	**1619**	44·3	44·0	43 6	43·9	44 1	44 4	46 1	45·9	46·7
																	Mr 2	Mr 12	Mr 22
65·9	65·7	65·4	65·0	64·3	63·6	62 9	62 0	61 2	60·3	**1620**	59·7	59·1	58 5	58 5	58 4	58 3	58 9	59 5	60 0
																	Mr 3	Mr 13	Mr 23
80·1	80·1	80·1	80 1	79·5	78·9	78·4	77·5	76·7	75·9	**1621**	75 1	74 4	73 6	73·3	73·0	72 7	72·9	73·2	73 5
93 9	94·1	94·3	94 6	94 4	94·1	93·7	92·9	92·1	91·4	**1622**	90·7	89·8	88 9	88 4	87·9	87 3	87 3	87 2	87 1
107 0	107 5	108 1	108·5	108·5	108·4	108·4	107·9	107 3	106 6	**1623**	105 8	105·0	104 1	103 4	102·7	102·0	101 7	101·4	101·0
																	Mr 2	Mr 12	Mr 22
119·6	120·3	121·0	121·7	122 0	122 2	122·4	122 0	121 7	121 4	**1624**	120·7	120·0	119·2	118 4	117·6	116·7	116·2	115·7	115·1
																	Mr 3	Mr 13	Mr 23
131·6	132·6	133 5	134 4	134 9	135 4	135 8	135·7	135·7	135 5	**1625**	134·8	134·3	132·6	132 8	132·0	131·2	130 5	129 8	129 1
143·3	144·3	145·4	146·4	147·5	147 8	148 4	148 5	148 6	148 8	**1626**	148·4	148·0	147·6	146·8	146 0	145 3	144 5	143 7	142·9
154 5	155·6	157·6	157 8	158·6	159·4	160 3	160·7	161 1	161 4	**1627**	161·2	161 1	160·8	160 2	159 6	159 0	158 2	157 4	156·5
																	Mr 2	Mr 12	Mr 22
165·2	166·4	167·6	168·7	169·7	170 7	171 7	172 3	172 7	173·3	**1628**	173·4	173 5	173·5	173 0	172 6	172·1	171·3	170·7	169 8
																	Mr 3	Mr 13	Mr 23
175 8	177 0	178·2	179 5	180 5	181 6	182·7	183 4	184 1	184 9	**1629**	185 1	185 4	185 5	185·3	185 0	184·7	184 1	183 3	182·7
186·2	187·4	188 6	189 8	190 9	192·0	193 1	193 9	194·8	195·7	**1630**	196 2	196 7	197 1	197·0	196 9	196·9	196 3	195·7	195·2
196 3	197·5	198·7	199 8	201·0	202·2	203 3	204·3	205 3	206·2	**1631**	206 9	207·5	208·1	208 3	208 5	208 5	208 1	207·8	207 8
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 3	Mr 13	Mr 23
206 2	207·5	208 6	209·7	210·9	212·1	213 3	214 3	215 5	216 4	**1632**	217 2	217·9	218 7	219·0	219 4	219·7	219·6	219 5	219 1
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
216·4	217·5	218·5	219·6	220 9	222·2	223 4	224 5	225 6	226·7	**1633**	227·5	228 3	229 2	229·6	230·1	230·5	230·4	230 4	230 4
226·2	227·2	228·2	229 3	230 5	231·7	232 8	233 9	235·1	236 2	**1634**	.237 2	238·2	239 5	239 8	240 5	241 2	241 4	241 6	241·7
236·4	237 3	238 2	239 1	240 2	241·3	242·5	243 7	244 9	246·0	**1635**	247·1	248·1	249 2	250·0	250·9	251·7	252 1	252 5	252 9
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 3	Mr 13	Mr 23
246·7	247·5	248·3	249 0	250·1	251·2	252 3	253 5	254 7	255 8	**1636**	256 9	258 0	259 1	260 1	261·0	262·0	262 5	263·1	263·7
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
257 1	257·8	258 4	259 1	260·1	261 1	262 1	263 3	264 5	265 6	**1637**	266 8	268·0	269 1	270 1	271 1	272 2	273 0	273·7	274·4
																	Mr 3	Mr 13	Mr 23
141·0	147·2	153·4	159 4	165 5	171 6	177·5	183 3	189·3	195 0	**1638**	200 8	206 2	211 5	216 9	221·9	226 3	231 2	235·2	238·9
268·0	268 5	269 0	269·5	270 4	271 3	272 2	273·3	274 3	275 4		276·6	277·8	278 9	280 0	281·2	282 3	283 2	284 1	285·6
266·5	272·9	279 4	286 3	293·3	300 2	307·4	314·5	321 7	328 9	**1639**	336 1	343 4	350·5	357·3	4 6	11 6	18 7	25 5	32·4
279·3	279·5	279·8	280 2	281·0	281 9	282·5	283·6	284 7	285·7		286·9	288·1	289 4	290 6	291 8	292·9	293 9	294·9	295 8
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 3	Mr 13	Mr 23
153·2	159·5	165·9	172·1	178·5	184·8	191 1	197 5	203·9	210 1	**1640**	216·6	222 9	229 2	235 7	242 0	248 2	254 6	260 8	267·0
291·1	291 2	291·3	291 3	291 9	292·6	293·2	294 2	295 2	296 1		297 3	298·5	299 6	300 8	302·0	303 3	304·4	305 5	306·7
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
306·6	309·3	313·1	317·2	322 1	327 3	332·6	338 4	344 3	350·4	**1641**	356 6	2 9	9 1	15·5	21 7	28 2	34 5	41·0	47 3
303 7	303·5	303·3	303 1	303 5	303 8	304·3	305 2	306·1	306 9		308·0	309 1	310·3	311 6	312 9	314 1	315 4	316·6	317·7
165·3	171·7	178·2	184·9	191·4	198·1	204·6	211·3	218 1	224·9	**1642**	231 8	238·8	245 6	252·7	259·6	266 7	273 9	281·0	288·1
316·4	316 1	315·7	315 3	315 5	315 7	316 0	316 6	317 3	318·0		319 1	320·2	321·2	322·4	323 6	324 9	326·2	327·5	328·8
23·7	21·6	19 1	16·1	14 7	13 6	13·3	14 4	16 6	19 4	**1643**	22·6	26·7	31 3	35·7	40 9	46·1	51 5	57·1	62·6
329·9	329·4	328·9	328·3	328 3	328·2	328 2	328·7	329·2	329 7		330 7	331·7	332 6	333·8	335·0	336 2	337·5	338 8	340·1
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 3	Mr 13	Mr 23
177 7	184·2	190 8	197·6	204·4	211·3	218 2	225·3	232·4	239 6	**1644**	246 8	254 1	261 4	268·8	276·3	283·8	291 4	299·0	306·8
344·1	343 4	342 7	341·9	341 6	341·3	341·1	341·4	341·7	342 0		342·7	343·5	344 3	345·4	346·5	347 7	349 0	350·3	351 6
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
69 4	73 0	75·7	77·4	78·4	77·7	75 9	72·8	69 3	65 7	**1645**	63·3	61 9	61 8	62·9	64 9	68·0	71 4	75·5	79·8
358·8	358·0	357·2	356·3	355·8	355 3	354 8	354·8	354·9	354 9		355 5	356·1	356·7	357·7	358·7	359·8	1 0	2·2	3·5
190 4	197·2	204·1	211 1	218 1	225·3	232·5	239·8	247 2	254 7	**1646**	262 1	269·6	277 3	285 1	292·8	300 7	308 5	316·3	324·2
198·3	198·4	190 9	187·8	194·7	207·0	222 7	240 0	257 4	274 4		289 6	300·6	304·9	299·1	293 4	297 3	308·4	324·3	341·9
13·8	13·0	12·2	11 3	10 6	9 9	9·2	9·0	8·7	8 4		8 8	9 2	9 5	10 4	11 2	12·0	13 2	14 4	15·6
92·4	97·4	102 1	106·6	110·0	113·0	115·4	116·4	116·7	115 5	**1647**	113·1	109·8	105 8	102·2	99 4	97 9	97·7	98·8	101 0
177·0	179·8	176 2	187·5	202·5	219 6	236 8	253 9	269 5	282·1		288 0	284·5	277·6	278·6	288 0	302·6	320·0	338·3	356·9
29 0	28·2	27·5	26·8	25·9	25 1	24·3	23·8	23 2	22 7		22·8	22·8	22·9	23·6	24·3	24 9	25 9	27·0	28 0
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 3	Mr 13	Mr 23
204 7	210·8	218·0	225·0	232·3	239 7	247·1	254·7	262·3	270 1	**1648**	278·7	285·6	293·4	301 3	309 2	317 0	325·0	332 8	340·6
157·8	168·0	182·5	198·9	216 3	233·4	249 5	263·0	270 9	269 7		262·3	260·6	268 2	281 7	298 2	316 3	334 6	352·7	8·8
44·2	43·6	43·0	42·3	41 4	40·6	39·7	39·0	38·3	37·6		37 4	37 2	37·0	37 3	37 7	38·0	38·9	39·8	40·7

Mag.	P. Phal.	U. Phal	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P Ash.	U. Ash.	Srav.	Dan.	Satab	P. Bhad	U. Bhad	Revati.
133·3	146·7	160·0	173 3	186·7	200·0	213·3	226·7	240 0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

from the citations of the same days in English writers for the following reason. In all countries in Europe, except the British Isles and to be the 15th October 1582, ten days being dropped, and A.D. 1700 was declared to be not a leap year. Similar changes were introduced into 14th September A.D. 1752, eleven days being dropped. In either case there was no interruption on the week-day reckoning. The present which in England was still called the 5 October 1582, following the old style.

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle.
Venus, A.D. 1765—A.D. 1999;

Year	Day of I.S.Y	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng date ...	Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1648	Mars ..	344.7	352.6	0.1	6.7	15.2	22.6	30.0	37.1	44.4	51.3	58.2	64.9	71.5	78.1	84.7	90.9	97.1	102.9
	Merc. ...	16.2	26.4	27.2	20.3	17.6	25.0	39.3	56.2	74.5	93.2	111.4	128.2	142.1	149.3	147.9	140.3	139.7	147.8
	Sat. ..	41.4	42.7	44.0	45.2	46.5	47.8	49.2	50.5	51.8	53.1	54.3	55.4	56.5	57.2	57.9	58.6	58.8	58.9
1649	Mars ...	129.4	130.0	131.8	134.2	137.6	141.5	145.9	150.7	155.9	161.3	167.1	172.9	179.0	185.3	191.7	198.3	205.1	211.8
	Merc. .	8.8	3.0	358.2	4.0	16.8	33.3	51.6	70.6	89.5	106.5	121.6	131.3	131.6	124.9	121.7	128.8	141.6	157.6
	Sat. .	54.3	55.5	56.7	57.8	59.1	60.4	61.7	63.1	64.4	65.8	67.1	68.3	69.5	70.4	71.3	72.3	72.7	73.1
1650	Mars .	0.3	8.1	15.6	22.9	30.2	37.3	44.5	51.6	58.5	65.4	72.1	78.7	85.4	91.8	98.4	104.6	110.8	117.1
	Merc. ..	340.0	342.7	355.1	10.7	28.7	47.5	66.6	84.6	100.2	111.7	114.6	108.5	103.7	108.2	121.1	136.5	153.8	171.5
	Sat. .	67.5	68.5	69.5	70.5	71.7	73.0	74.2	74.6	76.9	78.2	79.5	80.8	82.2	83.3	84.4	85.5	86.2	86.9
	Eng. date .	Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1651	Mars	170.8	167.6	165.7	164.5	164.8	166.3	168.9	172.2	176.1	180.6	185.6	191.0	196.8	202.7	208.9	215.3	222.0	228.9
	Merc. .	333.4	348.5	6.1	25.0	44.0	62.3	78.6	91.3	96.4	91.9	85.8	88.7	100.1	115.3	132.6	150.6	168.3	184.7
	Sat .	81.2	82.0	82.7	83.4	84.5	85.6	86.8	88.1	89.5	90.8	92.1	93.4	94.8	96.0	97.2	98.4	99.3	100.2
	Eng date .	Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1652	Mars .	15.5	22.7	30.0	37.1	44.1	51.2	58.0	64.9	71.7	78.3	85.1	91.7	98.0	104.6	111.0	117.4	123.7	129.7
	Merc	343.6	2.1	20.9	39.4	56.5	70.2	77.1	74.9	67.7	68.7	78.4	93.7	110.9	127.1	147.1	164.2	179.2	189.8
	Sat.	94.8	95.3	95.8	96.3	97.3	98.3	99.2	100.4	101.6	102.9	104.3	105.6	106.9	108.2	109.4	110.7	111.7	112.8
1653	Mars ...	224.2	224.2	222.8	220.7	217.8	214.7	212.6	211.1	211.3	212.3	214.6	218.0	222.0	226.7	231.8	237.5	243.5	249.8
	Merc. ..	358.3	15.8	33.9	48.6	57.8	57.0	49.8	48.3	57.5	72.0	88.9	107.1	125.5	143.1	159.0	171.4	176.6	172.3
	Sat. ...	108.6	108.8	109.0	109.3	110.1	110.8	111.5	112.6	113.7	114.9	116.2	117.5	118.7	120.0	121.3	122.7	123.8	124.9
1654	Mars ...	30.3	37.4	44.1	50.9	57.7	64.5	71.2	77.8	84.2	90.9	97.4	103.9	110.3	116.7	123.1	129.4	135.7	142.1
	Merc. ..	11.7	27.2	37.4	38.3	31.3	28.8	30.2	49.8	66.5	84.5	103.2	121.5	138.2	152.0	158.6	157.7	150.0	149.6
	Sat ..	122.5	122.4	122.3	122.3	122.8	123.4	123.9	124.8	125.7	126.7	127.9	129.1	130.4	131.7	133.0	134.2	135.4	136.6
	Eng. date. .	Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1655	Mars ...	259.9	265.1	269.8	274.1	278.0	281.1	283.2	284.8	285.1	284.0	281.8	279.3	274.2	275.7	275.4	277.0	279.4	283.0
	Merc. ..	16.3	19.9	13.8	9.1	14.3	27.4	43.8	62.1	81.1	99.5	116.8	131.5	141.2	142.0	134.8	131.5	138.2	151.3
	Sat ..	136.3	136.0	135.7	135.5	135.7	136.0	136.3	137.1	137.9	138.5	139.6	140.7	141.9	143.1	144.3	145.6	146.9	148.2
	Eng. date ...	Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1656	Mars ...	45.0	51.5	58.0	64.6	71.1	77.5	83.9	90.2	96.8	103.1	109.5	115.7	122.1	128.5	134.9	141.4	147.6	154.1
	Merc	356.6	350.4	353.5	5.4	21.1	39.1	58.1	76.8	94.7	110.4	128.8	124.9	119.1	114.0	118.6	130.6	146.1	163.3
	Jup	17.0	19.6	22.0	24.4	26.6	29.0	31.3	33.8	36.0	37.8	39.9	41.5	43.0	44.4	45.3	46.1	46.4	46.5
	Sat ..	150.0	149.5	149.0	148.4	148.4	148.5	148.5	149.1	149.7	150.1	151.1	152.0	153.0	154.2	155.4	156.6	157.9	159.2
1657	Mars ..	283.9	290.8	297.4	304.3	310.9	317.4	323.7	329.8	335.7	341.3	346.3	350.6	354.1	356.8	358.3	358.5	357.2	354.8
	Merc	338.9	343.4	358.6	16.4	35.2	54.2	72.6	89.1	101.9	107.0	102.5	96.5	98.6	110.1	125.0	142.2	160.0	177.6
	Jup. ...	44.9	47.1	49.2	51.2	53.2	55.2	58.2	60.5	62.9	65.2	67.5	69.8	71.8	73.5	75.2	76.9	78.3	79.3
	Sat .	163.4	162.7	162.0	161.4	161.1	160.9	160.7	161.0	161.3	161.6	162.4	163.2	164.0	165.1	166.2	167.3	168.5	169.7
	Eng. date	Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1658	Mars	59.7	65.9	71.9	78.0	84.1	90.3	96.5	102.7	108.9	115.2	121.5	127.8	134.1	140.4	146.8	153.2	159.7	166.2
	Merc.	336.9	353.9	12.4	31.2	49.8	66.8	80.6	88.2	85.6	78.5	79.3	89.0	102.9	120.7	138.8	156.6	173.0	188.7
	Jup	73.3	74.5	76.4	78.0	80.0	82.1	84.0	86.2	88.6	90.9	93.1	95.5	97.7	100.0	102.0	104.3	106.1	107.9
	Sat	176.4	175.6	174.9	174.1	173.7	173.3	172.9	173.0	173.1	173.1	173.6	174.2	174.9	175.8	176.8	177.8	179.0	180.2
1659	Mars	303.5	311.0	318.6	326.0	333.6	340.9	348.4	355.3	2.4	9.3	15.9	22.2	28.5	34.3	39.9	44.9	49.8	53.3
	Merc. ...	349.6	8.5	27.0	44.3	59.1	68.3	68.2	60.9	59.5	67.7	81.9	98.8	116.9	135.2	152.6	168.3	180.7	185.9
	Jup .	103.1	103.7	104.3	105.3	106.7	107.9	109.8	111.8	113.7	115.8	118.0	119.9	122.1	124.6	126.5	128.8	131.2	133.0
	Sat.	189.0	188.2	187.4	186.6	186.1	185.6	185.0	184.9	184.8	184.5	184.9	185.3	185.0	185.8	187.4	188.3	189.4	190.5
	Eng. date ..	Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1660	Mars ...	75.6	80.9	86.4	92.1	97.8	103.6	109.5	115.5	121.4	127.5	133.7	139.9	146.3	152.6	158.9	165.5	172.0	178.6
	Merc. ..	4.5	22.1	37.5	47.9	49.9	42.9	39.6	46.2	60.1	76.6	94.8	113.4	131.4	147.9	161.7	168.9	167.4	160.0
	Jup	135.0	134.5	134.2	134.4	134.6	135.4	136.5	137.5	139.0	140.6	142.4	144.4	146.4	148.5	150.6	152.8	155.0	157.2
	Sat ..	201.4	200.6	199.8	199.1	198.4	197.7	197.1	196.8	196.4	196.0	196.2	196.4	196.7	197.4	198.1	198.7	199.7	200.7
1661	Mars	321.5	329.3	337.1	344.8	352.3	359.8	7.4	14.7	21.9	28.9	36.0	42.7	49.5	56.0	62.1	68.2	73.9	79.4
	Merc. .	15.2	27.1	30.7	24.4	20.1	25.3	37.7	54.1	72.2	91.0	109.5	126.7	141.6	150.6	151.5	144.0	141.3	148.1
	Jup ..	168.7	167.3	166.4	165.5	164.0	164.6	164.4	164.6	165.6	166.4	167.6	169.1	170.6	172.4	174.3	176.4	178.4	180.6
	Sat. ..	213.5	212.8	212.1	211.3	210.5	209.7	209.0	208.5	208.1	207.6	207.6	207.5	207.5	208.0	208.5	209.0	209.9	210.8
	Eng. date ..	Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1662	Mars .	94.0	98.0	102.5	107.3	112.5	117.7	123.3	128.7	134.6	140.7	146.5	152.8	159.1	165.3	171.7	178.3	185.1	191.7
	Merc.	11.7	8.6	1.4	4.5	15.9	31.6	49.6	68.3	87.5	104.2	120.7	132.3	135.1	129.1	124.0	128.7	140.4	155.6
	Jup. ...	202.7	201.5	200.6	198.8	197.7	196.7	195.5	195.0	194.7	194.7	195.0	195.6	196.5	197.6	199.3	200.7	202.4	204.4
	Sat ..	225.1	224.5	223.9	223.3	222.5	221.7	221.0	220.3	219.7	219.0	218.8	218.6	218.5	218.8	219.1	219.4	220.1	220.9
1663	Mars	338.4	346.1	353.9	1.6	9.2	16.6	23.9	31.2	38.4	45.5	52.2	59.0	65.9	72.3	78.7	84.9	91.2	97.2
	Merc. ..	343.4	344.0	354.0	9.0	26.7	45.6	64.6	82.9	99.3	112.0	117.6	113.3	106.7	109.0	120.0	134.8	151.8	169.5
	Jup. ...	236.3	235.5	234.8	234.1	232.8	230.8	230.1	228.4	227.6	226.8	225.3	225.6	225.6	226.0	226.6	227.4	228.7	230.1
	Sat. ...	236.5	236.3	236.1	235.1	234.3	233.5	232.8	232.1	231.4	230.6	230.2	229.8	229.4	229.6	229.8	229.9	230.5	231.1

Mesh.	Vrsh.	Mith.	Kat.*	Sim.	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit	Rohi.	Mrig.	Ardh	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13.3	26.7	40.0	53.3	66.7	80.0	93.3	106.6	120.0

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999, Jupiter, A.D. 1656—A.D. 1999, Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260	270		280	290	300	310	320	330	340	350	360
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
108·9	114·7	120·1	125·3	130·2	134·9	139·0	142·6	145·7	147·7	**1649**	148·9	148·7	147·3	144·8	140·9	137·5	134·0	131·0	129·9
162·1	178·3	195·8	212·9	229·5	248·9	253·4	254·9	248·3	244·1		249·0	261·4	277·1	294·6	312·8	330·6	347·4	1·0	8·7
59·0	58·6	58·3	57·8	57·0	56·2	55·4	54·6	53·8	53·0		52·6	52·1	51·6	51·7	51·8	51·8	52·5	53·2	53·9
218·8	225·9	238·1	240·4	247·8	255·4	263·0	270·7	278·5	286·2	**1650**	294·1	302·0	309·9	317·6	325·5	333·4	341·2	348·7	356·6
174·7	192·3	209·4	224·4	235·9	239·5	235·2	228·6	231·1	241·6		256·3	273·1	291·1	308·8	325·8	339·9	349·2	349·3	342·2
73·6	73·5	73·3	73·2	72·5	71·8	71·3	70·4	69·5	68·7		68·0	67·3	66·5	66·8	66·1	66·0	66·4	66·7	67·2
123·1	129·0	134·8	141·5	146·1	151·5	156·8	161·4	166·3	170·7	**1651**	174·4	177·8	180·4	181·8	182·6	181·9	179·8	176·4	172·5
189·1	204·8	217·7	223·9	221·8	213·8	213·4	221·3	236·2	252·3		269·8	287·6	304·6	319·6	329·7	332·1	325·8	321·1	326·3
87·6	87·7	87·8	87·9	87·5	87·1	86·6	85·8	85·0	84·3		83·5	82·7	81·8	81·4	81·0	80·5	80·6	80·6	80·7
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 3	Mr 13	Mr 23
235·9	242·9	250·2	257·4	265·9	272·4	280·0	287·8	295·5	303·2	**1652**	311·0	318·7	326·3	334·1	341·9	349·3	356·8	4·4	11·6
198·8	207·4	207·5	199·8	197·0	203·4	216·4	232·1	249·1	266·7		283·6	299·0	310·6	314·7	309·5	303·4	307·0	318·8	334·3
101·5	101·5	101·8	102·2	102·0	101·9	101·8	101·1	100·4	99·7		98·8	97·9	97·1	96·5	95·9	95·2	95·0	94·8	94·7
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
136·0	142·0	148·2	154·1	160·1	165·9	171·8	177·5	183·1	188·7	**1653**	194·0	198·9	203·9	208·4	212·6	216·5	219·8	222·2	223·8
192·6	186·4	181·1	184·9	196·8	211·8	228·1	246·0	263·1	278·9		291·4	297·5	294·3	287·1	288·0	297·0	312·5	330·0	348·3
113·3	114·4	115·1	115·8	115·9	116·0	116·0	115·4	115·1	114·6		113·8	113·0	112·3	111·5	110·7	109·9	109·5	109·1	108·6
256·4	263·1	270·1	277·1	284·4	291·8	299·1	306·6	313·9	321·4	**1654**	328·5	336·2	343·6	350·9	358·1	5·4	12·4	19·6	26·6
165·6	167·2	177·3	191·5	208·0	225·4	242·5	258·8	272·1	280·2		279·4	271·7	269·9	278·0	291·6	308·0	326·1	344·7	2·8
126·1	126·9	127·7	128·6	129·0	129·3	129·7	129·5	129·3	129·0		128·8	127·6	127·0	126·2	125·5	124·7	124·1	123·5	122·9
148·3	154·7	160·8	166·1	173·3	179·6	185·8	191·9	198·0	204·3	**1655**	210·4	216·6	222·7	228·6	234·6	240·5	246·1	251·8	257·2
157·7	171·5	187·6	205·0	222·3	238·6	253·1	263·0	264·0	257·2		253·3	258·8	270·9	286·5	304·0	322·5	340·4	357·4	11·5
137·9	138·9	139·9	140·9	141·6	142·2	142·6	142·6	142·7	142·7		142·2	141·7	141·2	140·5	139·6	138·8	137·1	137·4	136·4
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 3	Mr 13	Mr 23
287·2	292·0	297·6	303·1	309·2	315·4	321·7	328·5	335·0	341·5	**1656**	348·2	354·9	1·5	8·3	15·0	21·5	28·2	34·8	41·4
167·1	184·2	201·9	218·5	233·7	244·8	248·7	243·6	237·4	240·0		251·0	266·9	282·9	300·8	318·6	335·8	350·2	359·8	0·0
149·4	150·5	151·8	152·7	153·4	154·1	154·9	155·2	155·4	155·7		155·4	155·1	154·9	154·2	153·5	152·7	152·0	151·2	150·4
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
160·5	166·9	173·5	179·7	186·2	192·9	199·5	205·9	212·6	219·1	**1657**	225·8	232·7	239·4	246·0	252·8	259·6	266·5	273·5	280·4
180·7	198·3	214·0	226·6	233·1	230·5	222·8	222·6	231·5	245·5		261·8	279·7	297·2	314·3	329·2	339·8	342·4	335·9	331·8
46·1	45·6	44·6	43·4	42·0	40·1	39·4	38·0	37·1	36·3		36·0	35·8	36·1	36·9	37·9	38·8	40·8	42·0	43·6
160·4	161·5	162·6	163·8	164·7	165·6	166·5	166·9	167·4	167·9		167·8	167·8	167·7	167·1	166·6	166·1	165·3	164·5	163·7
353·2	349·9	348·7	348·5	349·7	351·7	354·5	358·1	2·0	6·5	**1658**	11·3	16·5	21·9	27·4	32·9	38·8	44·8	50·6	56·5
194·2	208·0	216·7	216·1	208·8	205·4	212·9	225·5	241·2	258·5		276·0	293·2	308·7	320·4	324·9	319·6	314·0	316·8	328·6
80·3	80·6	81·0	80·7	80·4	79·5	78·4	77·2	76·0	74·6		73·3	72·3	71·4	70·7	70·7	70·5	70·9	71·7	72·5
171·0	172·2	173·4	174·6	175·6	176·6	177·6	178·2	178·8	179·6		179·8	180·0	180·1	179·7	179·3	179·0	178·2	177·4	176·8
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
172·6	179·3	186·0	192·6	199·3	206·1	212·9	219·7	226·9	233·8	**1659**	240·8	248·1	255·2	262·5	269·7	277·3	284·7	292·1	299·8
199·0	201·5	195·1	190·3	194·5	205·8	220·6	237·7	255·1	272·4		288·2	301·0	307·2	303·8	296·8	297·9	307·9	322·6	339·9
109·4	110·9	111·9	112·9	113·4	113·8	113·7	113·3	112·6	111·6		110·5	109·0	107·8	106·7	105·3	104·3	103·7	103·4	103·2
181·3	182·5	183·7	185·0	186·1	187·2	188·3	189·1	189·9	190·7		192·1	191·4	190·8	191·6	191·4	191·3	190·7	190·1	189·5
																	Mr 3	Mr 13	Mr 23
56·3	58·4	59·5	59·1	57·5	54·7	51·7	48·6	46·2	45·1	**1660**	45·0	46·2	48·4	51·2	54·7	58·5	63·1	67·8	72·8
184·3	174·8	176·3	186·5	200·7	217·3	234·5	251·8	268·9	281·5		289·6	288·7	281·4	279·4	287·4	301·1	317·8	336·1	354·5
135·0	137·0	139·0	140·3	141·7	143·1	143·9	144·4	144·8	144·7		144·3	143·8	142·9	141·8	140·3	139·3	137·7	136·6	135·7
191·6	192·8	194·0	195·1	196·3	197·3	198·6	199·4	200·4	201·4		201·9	202·4	203·0	203·0	203·1	203·2	202·7	202·2	201·7
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
185·2	191·9	198·8	205·7	212·8	219·8	226·7	234·0	241·3	248·7	**1661**	256·0	263·4	271·0	278·6	286·4	294·1	301·9	309·7	317·4
158·6	166·6	180·8	196·8	214·1	231·4	247·9	262·3	272·0	273·4		266·7	262·6	267·6	280·5	296·8	314·2	332·5	350·6	7·5
159·4	161·6	163·6	165·6	167·5	169·1	170·6	172·2	173·2	174·2		174·7	175·1	175·0	174·5	174·1	173·0	171·9	170·6	169·4
201·7	202·9	204·1	205·2	206·4	207·6	208·7	209·7	210·7	211·8		212·4	213·1	213·9	214·2	214·4	214·6	214·4	214·0	213·8
84·6	89·2	93·4	97·0	100·0	102·1	103·0	102·7	101·3	98·4	**1662**	94·5	90·9	87·7	85·2	84·5	84·8	86·4	89·0	92·1
160·7	176·4	193·4	210·9	227·6	242·7	254·2	257·8	252·4	246·5		249·6	260·3	275·2	292·3	310·8	328·6	345·4	0·4	10·1
182·8	185·0	187·1	189·3	191·5	193·6	195·5	197·6	199·3	200·9		202·4	203·3	204·2	204·9	205·3	205·2	204·9	204·4	203·4
211·6	212·7	213·8	215·0	216·2	217·5	218·6	219·7	220·8	221·9		222·8	223·6	224·5	224·9	225·3	225·6	225·7	225·9	225·3
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
198·5	205·4	212·3	219·6	226·8	233·9	241·3	248·8	256·3	263·9	**1663**	271·5	279·3	287·1	294·9	302·8	310·6	318·5	326·5	334·3
171·8	189·3	207·6	223·2	235·9	241·9	239·5	231·6	231·3	240·8		254·7	271·1	288·9	306·7	324·0	339·8	350·3	352·9	346·5
206·5	208·5	210·6	212·9	215·1	217·3	219·5	221·7	223·8	225·9		228·0	229·7	231·3	232·8	234·2	235·1	236·0	236·3	236·3
221·6	222·7	223·7	224·7	225·9	227·1	228·2	229·3	230·4	231·6		232·6	233·6	234·6	235·1	235·7	236·1	236·5	236·6	236·6
																	Mr 3	Mr 13	Mr 23
102·8	108·4	113·7	118·5	123·2	127·2	130·9	133·6	135·6	136·6	**1664**	136·5	135·2	131·9	128·4	124·5	121·0	118·7	117·3	117·1
187·1	203·5	217·2	225·4	225·3	217·3	215·0	221·6	234·6	250·6		267·8	285·6	303·0	318·4	330·4	334·9	330·1	324·0	327·3
231·6	233·4	235·4	237·5	239·4	241·9	244·1	246·3	248·7	250·9		253·1	255·3	257·3	259·3	261·2	263·2	264·8	266·1	267·2
231·7	232·6	233·6	234·6	235·8	237·0	238·1	239·2	240·3	241·5		242·5	243·5	244·6	245·3	246·1	246·9	247·2	247·4	247·7

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Srav.	Dan.	Satab.	P. Bhad.	U. Bhad	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle.
Venus, A.D. 1765—A.D. 1999;

Day of I.S.Y		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ...	Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1664	Mars ...	117·8	119·6	122·2	125·5	129·5	134·0	138·9	144·1	149·5	155·1	160·9	166·8	173·1	179·3	185·9	192·4	199·1	206·0
	Merc. ...	332·9	346·8	4·0	22·6	41·5	60·3	77·3	91·2	98·7	96·7	89·5	89·5	99·4	113·6	130·5	148·2	166·0	183·2
	Jup ...	267·6	268·5	268·7	268·6	268·3	267·8	266·8	265·6	264·3	263·0	261·7	260·5	259·4	258·6	258·3	258·0	258·2	258·9
	Sat. ...	248·7	247·4	247·2	246·8	246·1	245·5	244·8	244·1	243·3	242·6	241·9	241·3	241·8	240·7	240·6	240·6	241·0	241·4
1665	Mars	354·4	2·0	9·7	17·1	24·4	31·7	39·0	46·1	53·1	60·0	66·9	73·6	80·2	86·8	93·1	99·6	105·7	111·9
	Merc. ...	341·6	359·7	18·7	37·3	55·0	69·8	78·7	79·0	71·7	70·0	79·2	92·2	108·7	125·9	145·1	162·3	178·1	190·2
	Jup. ..	297·2	299·0	300·3	301·6	302·5	302·9	303·1	302·8	302·3	301·7	300·7	299·4	298·1	296·6	295·4	294·3	293·4	292·6
	Sat. ...	258·7	258·6	258·5	258·4	257·8	257·2	256·6	255·8	255·0	254·2	253·6	253·0	252·3	252·1	251·9	251·6	251·8	252·1
	Eng. date ...	Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1666	Mars ...	152·0	150·5	150·1	150·6	152·6	155·3	158·7	163·0	167·8	172·4	177·7	183·5	189·3	195·5	201·8	208·4	215·1	222·9
	Merc. ..	356·0	14·7	32·4	47·8	58·5	60·8	54·2	50·8	57·2	70·4	86·9	104·9	123·2	141·2	157·4	171·1	178·5	176·7
	Jup. ...	325·5	327·7	330·0	331·7	333·6	335·2	336·4	337·6	338·3	338·7	339·1	338·6	338·2	337·2	336·0	334·7	333·3	331·9
	Sat. ...	269·7	269·8	269·9	269·9	269·6	269·1	268·7	267·9	267·1	266·4	265·7	265·0	264·2	263·8	263·3	262·9	262·9	263·0
1667	Mars ...	9·8	17·2	24·5	31·6	38·9	45·9	52·8	59·8	66·8	73·4	80·1	86·6	93·3	99·8	106·1	112·4	118·7	125·0
	Merc. .	10·0	26·0	37·8	42·0	36·5	31·3	36·0	48·5	64·5	82·5	101·1	119·5	136·6	151·2	160·8	161·6	154·3	151·1
	Jup ..	353·2	355·6	358·0	0·4	2·6	5·0	6·8	8·9	10·6	12·1	13·5	14·4	15·0	15·5	15·8	15·1	14·5	13·4
	Sat ...	280·5	280·8	281·1	281·4	281·1	280·8	280·6	280·0	279·2	278·5	277·8	277·0	276·3	275·6	275·1	274·5	274·3	274·2
	Eng. date ...	Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1668	Mars ..	204·5	201·8	198·5	195·4	192·4	191·1	191·0	192·1	194·2	197·3	201·1	205·6	210·6	215·9	221·8	227·9	234·4	241·0
	Merc. ..	16·7	22·9	18·7	12·5	14·7	26·3	41·9	59·9	78·6	97·2	115·0	130·7	142·1	145·3	139·6	133·9	138·0	149·8
	Jup ...	21·0	23·4	25·8	28·2	30·6	33·0	35·3	37·7	39·8	41·9	43·8	45·5	47·4	48·6	49·7	50·7	51·1	51·2
	Sat ...	291·4	291·9	292·3	292·8	292·7	292·7	292·7	292·2	291·7	291·3	290·4	289·6	288·6	287·9	287·3	286·7	286·4	286·1
1669	Mars	24·6	31·6	38·6	45·6	52·4	59·4	66·2	72·8	79·4	86·0	92·7	99·1	105·5	112·0	118·4	124·8	131·1	137·4
	Merc. ...	1·1	353·8	354·8	4·5	19·6	37·1	55·1	74·1	92·1	109·6	121·3	127·4	123·5	116·9	119·4	129·7	144·6	161·3
	Jup. .	48·6	50·5	52·6	54·8	57·0	59·4	62·0	64·3	66·4	69·0	71·3	73·2	75·5	77·5	79·1	80·8	82·5	83·6
	Sat. ...	302·2	302·8	303·8	304·2	304·4	304·6	304·8	304·4	304·0	303·7	303·0	302·4	301·6	300·8	300·0	299·2	298·7	298·2
	Eng. date ..	Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1670	Mars	248·0	251·7	254·7	256·9	258·4	258·6	257·7	255·6	253·2	250·6	248·7	247·2	248·8	250·7	253·7	257·5	262·3	267·4
	Merc. ...	335·2	343·9	357·1	14·5	33·1	52·2	70·7	87·8	101·4	109·3	107·3	100·2	100·1	109·2	123·6	140·2	158·1	175·6
	Jup. ...	77·2	78·5	79·9	81·6	83·5	85·5	87·6	89·8	92·1	94·4	96·6	98·9	101·8	103·2	105·6	107·7	109·7	111·4
	Sat ...	313·0	313·9	314·8	315·7	316·1	316·5	317·0	316·9	316·6	316·6	316·0	315·4	314·8	314·0	313·2	312·4	311·7	311·0
1671	Mars ...	39·2	45·8	52·6	59·2	65·9	72·4	78·9	85·5	91·9	98·5	104·9	111·2	117·6	123·9	130·5	136·7	143·0	149·4
	Merc ...	335·3	351·8	9·8	28·9	48·0	65·3	80·3	89·9	90·3	82·9	80·6	88·3	102·0	118·7	136·5	154·4	171·8	187·4
	Jup ...	107·4	107·8	108·2	109·2	110·4	111·8	113·3	115·1	117·0	118·9	121·8	123·4	125·6	127·6	130·0	132·2	134·2	136·5
	Sat ...	324·2	325·2	326·3	327·3	328·0	328·6	329·2	329·3	329·4	329·5	329·1	328·7	328·2	327·4	326·9	325·8	325·0	324·2
	Eng date ...	Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1672	Mars ...	275·5	281·6	287·9	294·1	300·0	305·7	311·0	316·0	320·5	324·4	327·6	329·5	330·3	329·2	327·2	324·9	322·4	321·1
	Merc. .	347·5	6·1	25·0	42·9	58·6	69·7	72·1	65·8	61·5	67·9	80·6	96·8	115·8	133·0	150·9	166·3	180·6	187·8
	Jup. .	139·7	138·8	138·5	138·3	138·8	139·3	140·2	141·3	142·4	144·1	145·8	147·7	149·5	151·6	153·7	155·9	158·1	160·5
	Sat ..	335·5	336·6	337·7	338·9	339·8	340·6	341·5	341·8	342·2	342·6	342·4	342·2	341·9	341·2	340·6	340·0	339·2	338·4
1673	Mars	54·0	60·3	66·4	72·8	78·9	85·3	91·6	97·8	104·2	110·3	116·8	123·1	129·3	135·7	142·2	148·6	155·0	161·4
	Merc. ...	2·1	20·2	36·4	48·2	53·0	48·3	42·4	46·8	58·7	74·6	92·5	111·1	129·3	146·2	161·6	170·4	171·0	164·2
	Jup ..	173·3	172·0	170·9	170·1	169·3	168·7	168·7	168·9	169·4	170·2	171·3	172·4	174·1	175·8	177·7	179·4	181·7	183·6
	Sat. ...	347·0	348·2	349·4	350·7	351·8	352·8	353·8	354·4	355·0	355·7	355·7	355·8	355·8	355·4	355·0	354·4	353·6	352·8
	Eng date ...	Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16.	Au 26	S 5	S 15
1674	Mars ...	296·0	303·4	310·8	318·1	325·3	332·4	339·6	346·4	353·4	359·8	6·1	12·1	17·7	23·1	27·6	31·6	34·9	36·9
	Merc ..	14·3	27·5	33·5	29·9	23·4	25·9	36·9	52·4	70·2	88·9	107·4	125·0	140·5	151·6	154·9	149·2	148·7	147·9
	Jup ...	207·4	206·2	205·0	203·6	202·4	201·2	200·2	199·3	198·9	198·9	198·8	199·5	200·3	201·4	202·6	204·2	205·9	207·2
	Sat ...	358·6	359·9	1·2	2·5	3·7	4·9	6·0	6·8	7·7	8·6	8·9	9·2	9·6	9·4	9·1	8·9	8·2	7·5
1675	Mars ..	69·2	74·8	80·5	86·4	92·3	98·3	104·4	110·4	116·5	122·6	128·8	135·1	141·5	147·8	154·2	160·7	167·1	173·7
	Merc ..	13·8	12·3	5·1	5·1	15·1	29·9	47·6	66·2	85·1	103·4	119·6	132·3	137·9	134·1	127·5	128·8	139·6	153·8
	Jup ...	240·5	240·4	239·6	239·0	237·8	237·5	235·2	233·7	232·7	231·4	230·7	230·3	229·9	230·1	230·7	231·3	232·5	233·8
	Sat. ...	10·6	11·7	13·2	14·6	15·6	17·2	18·5	19·5	20·5	21·6	22·2	22·8	23·4	23·5	23·5	23·5	23·0	22·6
	Eng. date ...	Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1676	Mars ..	314·6	322·2	330·1	337·7	345·4	352·9	0·4	7·5	14·8	21·9	28·6	35·5	42·0	48·3	54·2	60·2	65·7	70·6
	Merc. ..	347·5	345·4	352·9	7·3	24·6	43·1	62·3	80·7	97·9	112·0	119·9	118·1	110·2	110·0	119·3	133·1	149·8	167·4
	Jup. ..	272·0	272·7	273·3	273·4	273·4	272·8	272·0	270·8	269.5	268·1	267·0	265·5	264·4	263·7	262·9	262·7	262·9	263·2
	Sat. ...	23·0	24·3	25·6	26·9	28·2	29·6	31·0	32·2	33·4	34·5	35·4	36·2	36·9	37·3	37·6	38·0	37·7	37·5
1677	Mars ...	85·9	91·0	95·8	101·1	106·4	112·0	117·1	123·4	129·8	135·4	141·4	147·7	153·8	160·3	166·7	173·3	179·8	186·5
	Merc. .	332·8	345·3	2·1	20·4	39·4	58·4	75·7	90·7	100·6	100·7	98·4	91·2	98·8	111·9	128·5	146·0	164·0	181·3
	Jup. ...	301·2	302·9	304·7	305·8	306·7	307·6	307·8	308·0	307·5	306·8	306·0	304·8	303·5	302·0	300·7	299·6	298·4	297·7
	Sat. ...	35·4	36·7	38·0	39·4	40·7	42·0	43·4	44·7	46·0	47·2	48·3	49·4	50·5	51·1	51·6	52·1	52·2	52·1

Mesh.	Vrsh	Mith.	Kat	Sim.	Kan.	Tul.	Vrsch.	Dhan.	Mak	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·6	120·0

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999, Jupiter, A.D. 1656—A.D. 1999, Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260	270		280	290	300	310	320	330	340	350	360
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
212·9	219·8	227·0	234·8	241·8	249·2	256·7	264·4	271·9	279·8	**1665**	287·6	295·4	303·4	311·3	319·1	326·9	334·8	342·7	350·4
197·8	208·2	210·6	204·5	199·1	203·0	214·9	230·2	247·0	264·5		281·8	297·7	310·6	317·0	314·4	307·3	307·6	317·9	332·5
259·8	260·9	262·5	264·1	265·8	267·8	269·9	271·9	272·9	276·6		278·9	281·3	283·6	286·0	288·2	290·4	292·5	294·5	296·5
241·8	242·8	243·6	244·4	245·6	246·7	248·8	249·0	250·2	251·3		252·4	253·5	254·6	255·4	256·3	257·2	257·7	258·1	258·6
117·9	123·6	129·5	134·9	140·8	145·5	150·2	154·9	158·9	162·5	**1666**	165·5	167·7	168·9	168·6	167·1	164·6	161·0	157·1	153·3
195·1	191·8	184·0	185·8	195·9	210·0	226·4	243·9	261·0	277·4		291·0	299·1	298·9	290·9	289·0	297·4	310·4	327·8	346·2
292·4	292·4	292·9	293·7	294·9	295·9	297·5	299·2	300·5	303·8		305·4	307·8	310·1	312·4	315·1	317·3	319·7	322·1	324·4
252·3	253·0	253·7	254·5	255·5	256·5	257·6	258·7	259·9	261·1		262·3	263·5	264·6	265·5	266·5	267·5	268·1	268·7	269·4
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
228·9	236·0	243·2	250·6	258·0	265·7	273·3	280·9	288·7	296·5	**1667**	304·3	312·2	319·9	327·9	335·5	343·3	350·8	358·4	5·8
169·3	167·3	176·4	190·0	206·0	223·4	240·4	257·1	271·4	281·1		282·9	276·0	272·0	277·5	290·0	306·1	323·9	342·5	0·5
330·8	329·8	328·8	328·6	328·2	328·6	329·2	329·9	331·2	332·5		333·4	336·0	338·1	340·8	343·0	345·3	347·7	350·1	352·3
263·0	263·6	264·2	264·7	265·7	266·5	267·5	268·7	269·9	271·0		272·2	273·4	274·5	275·6	276·7	277·8	278·6	279·5	280·3
																	Mr 3	Mr 13	Mr 23
131·1	137·2	143·1	149·1	154·9	160·6	167·0	171·5	176·8	182·0	**1668**	186·8	191·4	195·6	199·3	202·2	204·7	206·0	206·5	205·6
157·3	170·1	185·8	202·8	220·3	236·9	252·0	263·1	267·2	261·9		255·8	258·7	269·7	284·7	302·0	320·2	338·4	355·8	10·8
12·3	10·9	9·5	8·3	7·1	6·1	5·5	4·8	4·8	5·3		5·7	6·8	8·0	9·4	11·2	13·0	15·2	17·4	19·4
274·1	274·4	274·9	275·3	276·1	277·0	277·8	278·9	280·0	281·0		282·3	283·5	284·6	285·8	287·1	288·2	289·1	290·0	291·0
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
247·7	254·6	261·8	269·1	276·6	283·9	291·4	299·0	306·6	314·2	**1669**	321·8	329·2	336·9	344·3	351·7	359·1	6·4	13·7	20·9
165·1	182·2	199·6	216·6	232·3	244·8	250·9	248·2	240·7	240·7		250·1	264·0	280·6	298·3	306·7	333·8	340·8	0·6	8·7
51·2	50·6	49·7	48·8	47·6	46·3	44·8	43·7	42·6	41·5		41·1	40·6	40·9	41·2	42·1	43·2	44·5	45·8	47·6
285·6	285·8	285·9	286·1	286·8	287·5	288·2	289·2	290·2	291·3		292·5	293·7	294·8	296·0	297·2	298·5	299·6	300·7	301·7
143·7	149·8	156·0	162·1	168·2	174·3	180·4	186·4	192·4	198·4	**1670**	204·3	209·9	215·7	221·2	226·6	232·0	236·9	241·6	245·6
178·0	196·3	212·6	226·1	234·7	234·3	227·3	223·6	230·2	244·0		259·8	277·4	295·2	312·5	328·4	340·2	345·5	340·7	334·9
84·5	85·0	85·7	85·5	85·1	84·5	83·5	82·3	81·0	79·8		78·5	77·4	76·1	75·5	75·2	74·9	75·1	75·6	76·6
297·7	297·6	297·6	297·6	298·1	298·5	299·1	300·0	300·9	301·8		303·0	304·2	305·3	306·5	307·7	309·0	310·2	311·4	312·6
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
278·0	279·0	285·3	291·9	298·6	305·4	312·2	319·2	326·3	333·2	**1671**	340·4	347·4	354·4	1·4	8·8	15·1	22·0	28·8	35·7
192·4	207·1	217·4	219·6	213·1	208·2	212·5	224·2	239·5	256·5		274·0	291·5	307·5	320·4	327·1	324·2	317·3	318·0	327·9
113·3	114·6	115·8	117·0	117·4	118·0	118·0	117·7	117·2	116·3		115·2	114·1	112·8	111·3	110·1	109·1	108·3	107·6	107·5
310·3	310·1	309·9	309·5	309·8	310·1	310·5	311·3	312·0	312·7		313·8	314·9	316·1	317·3	318·5	319·8	321·0	322·2	323·5
																	Mr 3	Mr 13	Mr 23
155·7	162·2	168·6	174·9	181·4	187·7	194·1	200·5	206·9	213·4	**1672**	220·0	226·5	233·0	239·4	246·0	252·4	258·9	265·5	271·9
199·3	204·2	199·9	193·2	194·6	204·8	219·2	235·7	253·1	270·5		286·9	300·7	308·7	308·4	301·0	299·2	306·8	321·0	337·8
138·5	140·6	142·4	143·9	145·7	146·6	147·5	148·4	149·1	149·1		148·7	148·4	147·5	146·4	145·1	143·9	142·5	141·2	140·5
323·5	323·1	322·7	322·2	322·3	322·4	322·4	323·0	323·6	324·3		325·3	326·3	327·3	328·6	329·7	331·0	332·3	333·6	334·9
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
320·7	321·6	323·8	326·7	330·6	334·9	339·5	344·8	350·0	355·8	**1673**	1·5	7·6	13·4	19·5	25·6	31·8	38·0	44·3	50·6
186·1	178·5	177·2	185·8	199·1	215·3	232·4	249·9	266·2	280·9		291·0	292·4	285·9	281·4	287·4	299·8	315·9	333·7	352·4
162·7	164·6	166·7	168·9	170·9	172·7	174·2	175·7	177·1	178·0		178·7	178·7	179·3	178·9	178·3	177·4	176·4	175·4	174·0
337·5	336·8	336·2	335·6	335·4	335·2	335·1	335·4	335·8	336·3		337·2	338·1	338·9	340·0	341·2	342·4	343·7	345·0	346·2
167·9	174·9	181·0	187·6	194·2	201·0	207·6	214·5	221·2	228·1	**1674**	235·0	242·0	249·1	256·2	263·2	270·5	277·7	285·1	292·4
160·3	166·9	179·2	195·0	212·0	229·3	246·0	261·2	272·6	276·8		271·6	265·1	268·3	278·9	294·4	311·7	330·0	348·4	5·6
185·8	188·3	190·2	192·8	194·5	196·9	198·9	200·9	202·6	204·2		205·7	207·2	208·1	208·7	209·2	209·5	209·1	208·6	207·9
352·0	351·2	350·4	349·6	349·2	348·7	348·4	348·6	348·8	348·9		349·5	350·2	350·9	351·9	353·1	354·1	355·4	356·7	358·0
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
37·8	37·4	35·7	33·4	30·5	28·3	26·1	25·3	26·1	27·6	**1675**	30·0	33·0	36·7	41·0	45·5	50·4	55·4	60·8	66·2
159·3	174·5	191·5	208·9	226·0	241·5	253·9	260·1	257·0	249·7		250·2	259·3	273·6	290·6	308·3	326·7	344·0	359·6	11·0
209·9	211·9	214·1	216·3	218·5	220·7	222·7	225·2	227·3	229·4		231·4	233·2	234·9	236·7	238·0	238·9	239·8	240·5	240·5
6·8	6·0	5·2	4·3	3·7	3·1	2·5	2·4	2·2	2·1		2·6	3·1	3·5	4·4	5·3	6·1	7·3	8·6	9·8
																	Mr 3	Mr 13	Mr 23
180·3	187·0	193·6	200·5	207·5	214·3	221·3	228·3	235·5	242·8	**1676**	249·1	257·5	265·0	272·4	279·9	287·6	295·2	302·9	310·7
170·7	188·0	205·6	221·8	235·3	243·5	243·2	235·6	232·9	239·8		253·8	269·3	286·9	304·2	322·5	338·8	350·8	355·8	351·8
235·4	236·8	238·8	240·9	242·9	245·2	247·4	249·7	252·0	254·3		256·6	258·7	260·9	263·2	265·1	267·0	268·6	269·9	271·2
22·0	21·2	21·3	19·6	18·8	18·1	17·3	16·8	16·4	16·1		16·2	16·4	16·6	17·4	18·2	18·9	20·0	21·1	22·2
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
75·3	79·4	82·8	85·5	87·0	87·8	87·1	84·8	81·7	78·1	**1677**	74·6	72·0	70·4	70·4	71·5	73·6	76·3	79·9	83·9
184·9	201·7	216·1	226·4	228·7	221·8	217·1	221·7	233·3	248·5		265·8	284·1	300·9	317·2	330·3	337·3	335·1	327·6	327·9
264·0	264·9	266·2	267·8	269·5	271·5	273·6	275·7	277·7	280·0		282·3	284·8	287·0	289·4	291·9	294·2	296·4	298·4	300·4
37·1	36·5	35·8	35·0	34·2	33·4	32·5	31·9	31·3	30·7		30·6	30·5	30·4	31·0	31·4	31·9	32·9	33·8	34·8
193·4	200·3	207·2	214·1	221·1	228·2	235·5	242·9	250·3	257·9	**1678**	265·5	273·1	280·8	288·6	296·4	304·1	312·1	320·1	327·8
196·3	208·7	213·2	208·7	202·1	203·5	213·6	228·2	244·0	262·5		279·8	296·4	310·2	319·1	318·3	311·8	309·5	317·3	330·3
297·3	297·1	297·5	298·2	299·0	300·2	301·7	303·3	305·1	307·1		309·3	311·6	313·9	316·3	318·5	321·2	323·5	325·9	328·3
52·1	51·6	51·1	50·6	49·8	49·0	48·1	47·4	46·6	45·8		45·5	45·2	44·7	45·0	45·2	45·5	46·2	46·9	47·7

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh	Mula	P. Ash.	U. Ash.	Srav.	Dan.	Satab.	P. Bhad.	U Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle Venus, A.D. 1765—A.D. 1999

Year	Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ...	Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 1
1678	Mars ..	331.9	339.8	347.5	355.2	2.7	10.3	17.6	25.0	32.3	29.3	46.1	53.1	59.7	66.4	72.6	78.9	84.9	90.
	Merc ...	338.8	357.7	16.4	35.2	53.2	69.0	80.0	83.1	76.6	72.5	78.2	90.9	107.0	124.6	142.5	160.6	176.7	189.
	Jup ...	329.4	331.7	333.8	335.7	337.9	339.5	340.8	342.2	343.1	343.8	344.0	343.8	343.5	342.6	341.6	340.3	339.2	337.
	Sat. ...	48.3	49.7	50.9	52.0	53.3	54.6	55.9	57.4	58.7	60.0	61.3	62.4	63.7	64.4	65.8	66.1	66.4	66.
1679	Mars ...	107.5	110.3	118.9	118.0	122.5	127.3	132.4	137.9	143.4	149.2	155.1	161.0	167.5	173.7	180.3	186.7	193.3	205.
	Merc.	354.0	12.2	30.6	47.0	59.5	64.2	59.2	53.6	57.6	69.2	85.1	102.7	121.1	139.2	156.0	170.5	179.8	180.
	Jup. ..	357.1	359.2	1.6	4.0	6.6	8.8	10.8	12.9	14.9	16.4	17.8	19.1	19.8	20.3	20.5	20.2	19.8	18.
	Sat.	61.5	62.5	63.7	64.7	66.0	67.3	68.5	69.9	71.2	72.6	73.9	75.2	76.4	77.5	78.5	79.5	80.1	80.
	Eng. date .	Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 1
1680	Mars .	348.3	356.0	3.6	11.0	18.7	26.0	33.2	40.5	47.5	54.5	61.4	68.0	74.8	81.2	87.8	94.0	100.1	106.
	Merc ...	7.9	24.7	38.1	45.3	41.7	34.7	36.9	47.2	62.6	80.4	98.8	117.2	135.0	150.2	161.5	164.7	159.2	153.
	Jup. ...	24.8	27.1	29.5	31.9	34.3	36.7	38.8	41.4	43.6	45.7	47.7	49.8	51.2	53.0	54.1	55.0	55.8	56.
	Sat .	74.9	75.7	76.6	77.5	78.6	79.9	81.1	82.4	83.7	85.0	86.4	87.7	89.2	90.2	91.3	92.5	93.4	94.
1681	Mars ...	137.0	136.9	137.6	139.7	142.5	146.0	150.1	154.7	159.7	165.0	170.7	176.5	182.6	188.8	195.3	201.8	208.5	215.
	Merc ...	16.7	24.9	23.3	16.2	16.1	25.6	40.5	57.9	76.5	95.2	113.2	129.5	142.2	147.7	143.9	137.0	187.8	148.
	Jup. ..	52.4	54.4	56.5	58.7	60.7	62.2	65.4	67.7	70.0	72.4	74.7	76.8	79.0	81.0	83.1	84.7	86.3	87.
	Sat. ...	88.4	89.0	89.7	90.3	91.4	92.4	93.5	94.5	96.0	97.2	98.6	99.9	101.3	102.5	103.8	105.0	106.0	107.
	Eng. date ...	Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1682	Mars ..	3.9	11.5	18.7	26.1	33.2	40.4	47.6	54.6	61.5	68.3	75.0	81.8	88.2	94.8	101.3	107.6	113.8	119.
	Merc. ...	5.5	358.6	356.3	3.8	17.9	35.1	53.6	72.6	91.2	108.2	122.0	129.8	128.2	120.8	120.3	129.1	142.9	159.
	Jup ...	81.3	82.3	83.8	85.2	87.0	89.1	91.0	93.2	95.5	97.8	100.0	102.3	104.6	106.7	108.9	111.1	113.1	114.
	Sat. ...	102.2	102.5	102.9	103.3	104.1	105.0	105.8	106.9	108.1	109.5	110.6	111.9	113.2	114.5	115.8	117.1	118.2	119.
1683	Mars ...	182.4	178.9	175.8	173.9	178.0	173.6	175.6	178.4	181.8	186.0	190.7	195.7	201.5	207.3	213.2	219.6	226.1	232.
	Merc	337.8	342.7	355.9	12.4	30.6	49.6	68.5	86.3	101.1	110.8	111.8	104.7	101.8	108.5	121.8	138.2	155.7	173.4
	Jup .	111.7	111.9	113.2	113.0	114.2	115.5	117.1	118.6	120.4	122.4	124.6	126.8	128.9	131.1	133.4	135.6	137.7	139.
	Sat. ...	116.1	116.1	116.2	116.3	117.0	117.7	118.2	119.3	120.3	121.3	122.6	123.9	125.1	126.4	127.9	129.0	130.2	131.4
	Eng. date	Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1684	Mars ..	18.9	26.1	33.2	40.2	47.2	54.2	60.9	67.7	74.6	81.2	87.8	94.3	100.9	107.2	113.8	120.0	126.2	132.7
	Merc. ...	334.2	349.8	7.9	26.1	45.1	64.0	79.0	91.1	93.8	87.9	83.1	88.7	101.1	116.9	134.3	152.4	170.0	186.1
	Jup. ..	144.3	148.5	142.8	142.5	142.6	143.1	143.9	144.7	146.0	147.4	149.2	154.1	153.0	154.8	156.9	159.1	161.3	163.5
	Sat. ...	130.0	129.7	129.5	129.4	129.8	130.1	130.6	131.4	182.8	133.1	134.3	135.4	136.6	137.9	139.2	140.4	141.6	142.
1685	Mars ..	233.8	235.1	235.6	234.9	233.0	230.7	227.5	225.4	223.8	223.6	224.4	226.7	229.9	233.9	238.6	243.8	249.6	255.
	Merc. ..	345.4	3.9	22.8	41.1	57.4	70.0	75.1	70.4	64.5	67.9	79.6	95.1	112.6	130.9	148.9	165.7	179.9	189.
	Jup. ...	178.0	176.7	175.4	174.6	173.8	172.9	172.8	172.7	173.1	173.9	174.7	176.0	177.4	179.2	181.0	182.9	184.8	187.1
	Sat. ..	143.7	143.2	142.8	142.5	142.6	142.8	112.8	143.5	144.2	144.8	145.8	146.8	147.9	149.1	150.3	151.5	152.8	154.1
	Eng. date ...	Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1686	Mars ...	33.4	40.4	47.2	54.0	60.6	67.4	74.0	80.5	87.0	93.6	100.1	106.5	112.9	119.5	125.7	132.0	138.3	144.7
	Merc. ...	0.2	18.4	35.2	48.9	55.8	53.0	46.0	47.4	57.9	73.2	90.6	109.0	127.3	144.8	160.0	171.0	174.4	168.
	Jup.	212.1	211.0	209.7	208.4	207.0	205.9	204.9	204.0	203.2	203.0	203.1	203.3	204.1	205.2	206.4	208.7	209.3	211.2
	Sat ..	157.2	156.6	156.0	155.4	155.2	155.2	155.1	155.5	155.9	156.3	157.2	158.1	159.0	160.0	161.2	162.3	163.5	164.
1687	Mars ...	265.8	271.5	276.9	281.9	286.7	291.1	294.9	297.9	300.0	301.0	301.1	298.9	296.4	293.8	291.8	291.4	292.1	293.9
	Merc.	12.8	27.4	37.6	34.9	27.7	26.9	36.4	50.8	68.9	86.6	105.3	123.5	139.5	152.1	157.5	154.3	146.9	148.7
	Jup. ...	245.2	244.8	244.4	243.6	242.6	241.3	240.2	238.8	237.6	236.5	235.3	234.8	234.8	234.6	234.6	235.5	236.5	237.5
	Sat ..	170.4	169.7	169.0	168.3	168.0	167.6	167.3	167.5	167.7	167.8	168.6	169.3	170.0	171.0	172.1	173.1	174.3	175.5
	Eng. date ..	Mar 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1688	Mars ..	48.4	54.7	61.2	67.6	74.0	80.4	86.7	93.2	99.3	105.7	112.1	118.4	124.7	131.2	137.5	143.8	150.3	156.8
	Merc. ..	15.1	16.5	9.5	6.8	14.8	28.4	45.7	63.9	82.9	101.5	118.3	132.1	139.8	138.3	131.9	120.2	138.9	152.4
	Jup. ...	276.2	277.1	277.6	278.0	278.0	277.8	276.9	275.9	274.7	273.6	272.1	271.0	269.6	268.6	268.0	267.4	267.4	267.7
	Sat ...	183.3	182.5	181.7	180.9	180.4	179.9	179.4	179.4	179.4	179.3	179.8	180.3	180.8	181.7	182.6	183.5	184.6	185.8
	Eng. date ..	Mr 29	Ap 8	Ap 18	Ap 23	My 8	Mp 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	An 26	S 5	S 15
1689	Mars ...	288.7	295.7	302.6	309.8	316.6	323.4	330.1	336.6	342.8	348.9	354.5	359.6	4.1	8.1	11.0	12.9	13.3	12.4
	Merc ...	352.3	347.8	353.3	6.2	22.8	41.1	60.2	78.9	96.5	111.2	120.9	122.0	115.0	112.2	118.7	131.8	147.9	165.9
	Jup	305.9	306.9	308.8	310.1	311.1	312.2	312.5	312.9	312.6	312.3	311.5	310.3	309.2	307.6	306.8	305.0	303.9	302.9
	Sat. ...	195.8	195.0	194.2	193.4	192.8	192.2	191.5	191.3	191.1	190.7	191.1	191.3	191.6	192.4	193.2	193.9	195.0	196.0
1690	Mars ...	63.0	69.1	74.9	81.0	87.1	93.1	99.2	105.4	111.6	117.9	124.0	130.3	136.6	143.0	149.4	155.8	162.3	168.8
	Merc. ...	332.2	344.8	0.3	18.2	37.1	56.1	74.2	90.0	101.3	104.5	98.5	93.7	98.6	111.0	126.7	144.0	161.8	179.4
	Jup. .	332.3	335.5	337.7	339.7	341.7	343.6	345.2	346.4	347.7	348.4	349.0	348.9	348.9	348.1	347.4	345.9	344.9	343.5
	Sat. ..	208.0	207.2	206.4	205.7	205.0	204.1	203.5	203.1	202.7	202.3	202.3	202.4	202.5	203.1	203.7	204.2	205.1	206.0
1691	Mars ...	307.6	315.2	322.8	330.3	337.8	345.3	352.7	359.9	7.0	14.0	20.7	27.4	38.7	39.7	45.5	50.8	55.5	60.2
	Merc. ..	337.9	355.6	14.0	33.1	51.6	68.1	80.6	86.1	81.5	75.4	78.6	89.8	104.9	122.5	140.6	158.6	175.1	189.4
	Jup. ...	0.9	8.3	5.4	8.8	10.6	12.7	15.1	17.1	19.1	20.6	22.1	23.6	24.5	25.0	25.5	25.4	24.9	24.4
	Sat. ...	219.8	219.1	218.4	217.7	216.9	216.1	215.4	214.8	214.2	213.7	213.5	213.5	213.4	213.8	214.1	214.6	215.4	216.3
	Eng. date ...	Mr 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1692	Mars ...	79.2	84.3	89.7	95.3	100.8	106.5	112.4	118.3	124.2	130.4	136.5	142.6	149.0	155.3	161.7	168.2	174.7	181.4
	Merc. ...	351.6	10.5	28.8	45.9	59.7	66.5	64.1	57.1	58.4	69.1	83.3	100.6	118.8	137.3	154.3	169.6	180.7	183.5
	Jup. ...	28.6	30.9	33.2	35.6	38.0	40.4	42.7	45.1	47.4	49.5	51.6	53.6	55.2	57.1	58.3	59.4	60.1	60.7
	Sat. ...	231.3	230.8	230.3	229.6	228.8	228.0	227.3	226.6	225.9	224.9	224.9	224.6	224.3	224.5	224.7	225.0	225.7	226.3

Mesh.	Vrsh.	Mith	Kat.	Śim.	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13.3	26.7	40.0	53.3	66.7	80.0	93.3	106.7	120.0

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260	270		280	290	300	310	320	330	340	350	360
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
96.8	101.7	106.5	111.1	115.1	118.7	121.4	123.1	124.0	123.8	**1679**	122.1	119.3	115.6	110.9	108.4	105.7	104.9	104.9	106.6
197.0	194.9	187.4	186.6	195.0	208.3	224.5	241.8	259.2	275.8		290.3	300.8	302.1	295.2	291.8	297.2	309.5	326.0	343.8
336.2	335.1	334.2	333.5	333.2	333.4	333.7	335.4	335.6	336.7		338.2	340.2	342.1	344.1	346.3	348.6	351.0	353.4	355.6
67.0	66.8	66.5	66.2	65.5	64.8	64.1	63.2	62.4	61.5		60.9	60.3	59.6	59.6	59.5	59.4	60.0	60.5	61.0
																	Mr 3	Mr 13	Mr 23
207.1	214.1	221.2	228.3	235.7	243.2	250.6	258.2	265.8	273.6	**1680**	281.2	289.1	297.0	304.8	312.7	320.5	328.6	336.4	344.1
178.1	169.8	176.3	188.5	204.2	221.2	238.6	255.5	270.5	282.0		285.3	280.3	274.4	278.0	288.9	304.2	321.7	340.2	358.6
18.0	16.7	15.3	13.9	12.4	11.4	11.5	10.1	9.8	9.8		10.4	11.3	12.2	13.7	15.3	16.9	19.0	21.1	23.3
81.2	81.2	81.2	81.2	80.6	80.1	79.6	78.7	77.9	77.1		76.3	75.6	74.8	74.5	74.1	73.8	74.0	74.3	74.5
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
112.1	118.0	123.4	128.8	134.0	138.8	143.4	147.2	150.7	153.2	**1681**	155.2	156.0	155.6	153.6	150.4	146.8	142.9	139.8	137.8
157.5	168.9	183.8	200.6	218.1	235.0	250.7	263.2	270.2	266.5		259.3	259.6	268.6	283.0	299.9	318.0	338.4	354.0	9.7
56.2	55.7	54.9	54.1	52.9	51.6	50.2	48.9	47.8	46.6		45.9	45.6	45.4	45.7	46.2	47.2	48.5	49.8	51.4
94.9	95.2	95.4	95.7	95.5	95.2	94.9	94.1	93.3	92.6		91.9	91.0	90.1	89.7	89.0	88.4	88.4	88.3	88.2
222.3	229.4	236.6	243.9	251.4	258.9	266.5	274.3	282.0	289.8	**1682**	297.6	305.5	313.4	321.1	329.0	336.8	344.5	352.2	359.8
163.5	180.1	197.6	214.6	230.9	244.5	252.7	252.0	244.4	242.3		249.4	262.6	278.8	296.4	314.6	332.2	348.4	1.0	6.5
88.8	89.6	90.2	90.2	89.9	89.2	88.6	87.4	87.2	85.0		83.5	82.2	81.2	80.4	79.7	79.5	79.8	79.9	80.8
108.0	108.5	109.1	109.5	109.6	109.5	109.5	109.0	108.4	107.7		106.9	106.1	105.3	104.6	103.8	103.1	102.8	102.5	102.1
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
126.1	132.1	137.8	143.6	149.3	155.0	160.3	165.8	170.3	174.9	**1683**	179.1	183.0	186.1	188.7	190.4	190.7	189.9	187.2	184.4
176.9	194.2	211.0	225.4	235.4	237.3	231.0	226.1	230.6	242.6		258.0	275.3	293.1	310.7	327.2	340.4	347.8	345.5	338.4
116.7	118.5	119.7	120.8	121.6	122.3	122.3	122.4	121.9	121.0		120.0	119.0	117.7	116.4	114.9	114.0	112.8	112.3	112.0
120.5	121.2	122.0	122.7	123.0	123.2	123.4	123.1	122.8	122.5		121.8	121.1	120.3	119.5	118.8	117.9	117.3	116.8	116.2
																	Mr 3	Mr 13	Mr 23
239.9	247.0	254.1	261.4	268.8	276.6	284.0	291.7	299.5	307.1	**1684**	314.9	322.6	330.2	337.7	345.5	352.9	0.4	7.6	15.0
190.7	206.0	217.9	222.6	217.7	210.6	212.8	228.0	237.6	254.1		271.9	289.5	306.0	320.2	328.7	328.8	321.4	319.4	326.9
142.0	143.9	145.8	147.5	149.0	150.5	151.7	152.4	153.2	153.3		153.1	152.9	152.2	151.1	149.8	148.6	147.0	146.0	144.8
132.5	133.5	134.4	135.4	135.8	136.4	136.8	136.7	136.7	136.5		135.9	135.2	134.7	133.9	133.1	132.3	131.6	130.9	130.2
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
138.7	144.9	151.0	157.1	163.1	169.0	175.0	180.7	186.6	192.3	**1685**	197.8	203.1	208.3	213.3	218.0	222.4	226.5	229.7	232.6
199.3	206.0	204.4	196.5	195.5	204.1	217.5	233.8	250.9	268.4		285.3	300.0	310.2	311.9	305.6	301.1	307.2	319.6	336.0
165.7	167.8	169.9	172.0	174.2	176.0	177.7	179.2	180.5	181.6		182.6	183.0	183.2	183.3	180.0	182.1	181.2	181.0	178.6
144.2	145.2	146.3	147.3	148.3	148.7	149.4	149.5	149.6	149.8		149.4	149.0	148.6	147.9	147.1	146.4	145.6	144.8	144.0
261.9	268.4	275.1	282.1	289.2	296.4	303.7	311.0	318.7	325.6	**1686**	332.9	340.2	347.5	354.7	1.7	8.9	15.9	23.1	29.8
189.6	182.4	179.2	185.4	197.7	213.3	230.3	247.7	264.7	279.9		291.2	295.4	290.2	284.3	287.5	298.7	314.2	331.7	350.3
189.0	191.3	193.4	195.8	198.0	199.9	202.3	204.2	206.1	207.8		209.3	210.7	212.0	212.7	213.5	213.7	213.5	213.3	212.6
155.3	156.4	158.3	158.7	159.5	160.3	161.2	161.6	162.0	162.3		162.2	162.1	161.8	161.2	160.6	160.0	159.2	158.4	157.4
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
151.0	157.3	163.5	169.9	176.1	182.5	188.7	195.0	201.8	207.5	**1687**	213.8	220.1	226.2	232.5	238.7	244.9	250.8	256.9	262.8
162.8	169.9	178.1	193.2	209.9	227.1	244.8	260.0	272.6	278.8		275.7	268.6	268.8	278.6	293.1	309.8	328.0	346.3	4.3
213.2	215.0	217.4	219.6	221.6	224.1	226.2	228.3	230.7	232.8		234.7	236.8	238.5	240.1	241.4	242.9	244.0	244.7	244.9
166.0	167.2	168.4	169.5	170.5	171.5	172.5	173.1	173.6	174.2		174.3	174.4	174.4	174.0	173.6	173.1	172.3	171.7	170.8
																	Mr 3	Mr 13	Mr 23
297.1	301.1	305.7	310.5	315.9	321.8	327.7	333.8	340.0	346.6	**1688**	353.0	359.2	5.6	12.1	18.7	25.1	31.8	38.1	44.6
158.8	172.8	189.4	206.7	224.1	240.4	253.7	261.8	261.2	253.9		251.3	258.5	272.1	288.4	306.3	324.4	342.3	358.5	11.6
239.1	240.7	242.6	244.4	246.7	248.9	251.1	253.2	255.7	257.9		260.0	262.5	264.7	266.9	268.8	270.7	272.4	274.2	275.5
176.6	177.8	179.0	180.3	181.3	182.4	183.5	184.2	184.9	185.7		185.9	186.2	186.4	186.2	185.9	185.6	185.0	184.3	183.7
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
163.2	169.7	176.1	182.5	189.2	195.8	202.3	208.9	215.6	222.3	**1689**	229.1	236.0	243.0	249.7	256.6	263.6	270.6	277.6	284.7
168.7	184.9	203.6	220.2	234.7	244.6	246.3	239.7	235.1	240.3		251.8	267.6	284.6	304.6	321.2	336.9	350.5	358.0	356.1
268.2	269.1	270.3	271.7	273.3	275.2	276.0	279.1	281.5	283.6		285.9	288.5	290.6	293.0	295.6	297.9	299.9	302.6	304.2
187.0	188.2	184.4	190.6	191.7	192.8	193.9	194.7	195.6	196.5		197.0	197.5	197.9	197.9	197.8	197.8	197.2	196.6	196.1
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
10.3	7.8	5.2	3.5	2.9	3.2	4.4	6.7	9.8	13.4	**1690**	17.6	22.4	27.1	32.2	37.4	42.9	48.5	54.4	60.1
188.0	200.0	215.1	226.6	231.1	226.4	219.9	220.0	232.3	247.0		263.8	281.5	299.1	315.8	329.9	338.9	338.9	331.3	329.8
302.4	302.2	302.1	302.7	303.5	304.5	305.8	307.4	309.0	311.0		313.7	315.3	317.7	320.1	322.4	324.9	327.9	329.7	332.7
197.1	198.3	199.5	200.6	201.8	203.0	204.1	205.1	206.1	207.0		207.7	208.3	208.9	209.1	209.3	209.4	209.0	208.7	208.2
175.4	181.9	188.7	195.4	202.1	209.0	215.8	222.7	229.9	237.8	**1691**	244.3	251.4	258.7	266.1	273.5	281.0	288.4	296.0	303.6
195.4	208.4	215.2	213.0	205.4	204.4	218.0	226.8	242.9	260.3		277.8	294.6	309.0	319.8	322.1	315.7	311.3	316.7	329.6
342.1	340.7	339.7	338.9	338.3	338.3	338.3	339.0	339.8	341.0		342.5	344.3	345.9	347.9	350.2	352.4	354.8	357.1	359.6
207.0	208.3	209.3	210.5	211.7	212.9	214.1	215.1	216.2	217.2		218.0	218.7	219.5	219.8	220.2	220.5	220.5	220.4	220.0
																	Mr 3	Mr 13	Mr 23
64.1	67.1	69.1	70.2	69.9	68.2	65.6	62.8	59.0	56.2	**1692**	54.6	54.6	55.4	57.5	60.1	63.7	67.5	72.0	76.7
198.4	198.8	191.5	188.1	194.7	206.9	222.4	239.7	257.1	274.2		289.4	300.7	305.2	299.7	293.8	297.4	308.4	324.1	341.7
23.4	22.1	20.7	19.3	18.0	16.9	15.9	15.1	14.7	14.6		15.0	15.8	16.8	17.9	19.2	21.2	23.1	25.0	27.2
217.1	218.2	219.2	220.3	221.6	222.9	224.1	225.2	226.3	227.4		228.2	229.1	230.0	230.4	230.9	231.3	231.8	231.8	231.3
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
188.1	194.9	201.7	208.5	215.6	222.8	229.9	237.2	244.5	252.0	**1693**	259.3	266.9	274.6	282.2	289.9	297.8	305.6	313.3	321.2
177.6	172.2	176.2	187.4	202.3	219.3	236.5	253.6	269.8	282.0		288.2	285.1	278.1	278.7	287.9	302.4	319.7	338.0	356.6
60.8	60.9	60.2	59.3	58.3	57.0	55.6	54.4	53.2	52.0		51.0	50.5	50.3	50.4	50.6	51.4	52.6	53.7	55.4
227.0	228.0	229.0	230.1	231.3	232.5	233.9	234.6	235.8	237.0		238.0	239.0	240.0	240.6	241.3	242.0	242.2	242.5	242.6

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Śrav.	Dan.	Satab.	P. Bhad.	U. Bhad.	Revati.
133.3	146.7	160.0	173.3	186.7	200.0	213.3	226.7	240.0	253.3	266.7	280.0	293.3	306.7	320.0	333.3	346.7	360.0

TABLI

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle

Venus, A.D. 1765—A.D. 1999

Day of I.S.Y.		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	17(
Eng.	date ..	Mar 29	Ap 8	An 18	Ap 28	My 8	My 18	Mv 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 1
1693	Mars .	325 3	333·1	340 9	348 4	356 0	3·6	11 1	18·4	25·6	32·7	39 8	46·5	53·2	59·7	66·0	72·1	78 1	83·
	Merc. ..	6 2	23 4	37·9	46 5	46 0	38 8	38·1	46 7	61·2	78 4	96 9	115·2	133 1	149 1	161 6	167·2	163 4	156·(
	Jup. ...	56 3	58 2	60 2	62 3	64 3	66 5	68·9	71·2	73·6	75 9	78 2	80 4	82 8	84 8	86·6	88 6	90·2	91·
	Sat. ..	242·7	242 3	241 9	241 5	240·8	240·1	239·3	238·5	237·8	237·0	236 5	236 0	235·6	235 5	235·6	235·6	236·2	236·
1694	Mars .	98·7	102 1	106·3	111 0	115 8	121·0	126·6	131·9	137 8	143·6	149·5	155·8	162 0	168·3	174·7	181·2	188·0	194·
	Merc ...	16 1	26 5	27·6	20 7	17·9	25 1	39·1	55 9	74 2	92·9	111·2	128 0	142·1	149 5	148·4	140 8	139·9	147·
	Jup. ..	85 1	86·3	87 6	89·1	90 9	92 8	94 6	96·7	98·9	101·2	103 2	105·6	107·9	110 2	112 4	114 5	116·6	118·
	Sup. ..	253 6	253 4	253·2	252 0	252·3	251 7	251·1	250 4	249·6	248·8	248·2	247·5	246·9	246 7	246·6	246·4	246·8	247·
1695	Mars ...	342·1	349·9	357·4	5·1	12·6	20·0	27·8	34 5	41·8	48 8	55 6	62 4	69·0	75·7	82 1	88 3	94·6	100·
	Merc ..	9·2	3 6	358·6	4 1	16·7	33 1	51·4	70 3	89 2	106 2	121·5	131 4	132 1	125 4	122·0	128·8	141·5	157
	Jup ..	116 0	116 1	116·5	117·0	118·1	119 3	120 6	122·2	124 0	126 0	128 1	130 2	132·4	134·3	136·5	139·0	141 2	143·
	Sat.	264 7	264·7	264·6	264·6	264·1	263 6	263 0	262 2	261 4	260 7	260 0	259·3	258 6	258 3	259·9	257·5	257·7	257·
Eng.	date ...	Mar 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 1
1696	Mars .	124 1	125 2	127·4	130 2	133 9	138 0	142 7	147 6	153 0	158 5	164 4	170 2	176 4	182 6	189 1	195·6	204 4	209·
	Merc. ...	340 4	342 9	355·0	10 5	28 5	47·8	66·4	84 4	100·1	111 7	115·0	109 1	104 1	108 3	120·9	136 3	153 5	171·
	Jup. ...	148 9	148·0	147 2	146 8	146 6	147·0	147 7	148 6	149 6	151 0	152 6	154 4	156 1	158 3	160·4	162·3	164·7	166·
	Sat.	275 4	275 7	275 9	276·1	275·7	275·4	275 1	274 3	273·6	272 9	272 2	271·4	270·6	270·1	269·6	269·0	268 9	269·
Eng.	date ...	Mar 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 1
1697	Mars ...	357 9	5·4	13 0	20 3	27 7	34 9	42 1	49 1	56·1	62 9	69 9	76 5	83·2	90 1	96 1	102·4	108 6	114
	Merc.	333 4	348·3	5 8	24 7	43 7	62·0	78·4	91·3	98·7	92·6	86 3	88 8	100 0	115·1	132 3	150·3	169·0	184·
	Jup ...	182 7	181 4	180 1	179 1	178·0	177 3	176 9	176 7	177 0	177 4	178 6	179·5	180 9	182 5	184 4	186 0	188 2	190
	Sat ...	286·4	286·7	287·0	287 5	287 3	287·1	287·0	286·4	285 8	285 3	284·5	283 7	283·0	282 3	281·6	280 9	280 7	280
1698	Mars ..	162 1	159·3	158·0	158 1	158·8	161 1	164 1	167 8	172·0	176·7	182 0	187 4	193 3	199·5	205·6	212 1	218 8	225·
	Merc	343 4	1 8	20 6	39·2	56 3	70 2	77·3	75 4	68·2	68·9	78 5	93 5	110 6	127·0	146 9	164·0	179 0	189·
	Jup. ...	216 8	215·7	214 5	213 2	211·8	210·8	209 6	208 6	207·9	207 3	207 3	207·6	208 0	208 9	210·1	211·2	212·9	214
	Sat. ...	297·2	297 8	298 4	298·9	299 0	299 1	299·2	298·7	298·3	297 9	297·1	296 4	295·6	294·8	294 1	293·4	293·0	292·
1699	Mars ...	13 0	20 4	27 5	34·8	41 8	49 0	55·9	62 6	69·5	76·2	82 8	89·5	96·0	102·6	108 9	115·0	121·6	127
	Merc. ..	358 0	15 7	33 7	48 5	57 5	57·5	50 4	48 6	57·5	71 8	88 0	106 8	125·2	142·9	158 8	171 3	176 9	172
	Jup ...	249 4	249 2	249 2	248·3	247 6	246·4	245·1	243 8	242·5	240·9	240·1	239·4	239·0	238 8	238 9	239 6	240 3	241
	Sat.	308 1	308·9	309 6	310 4	310·8	311 1	311 3	311 1	310 8	310·6	310 0	309 4	308 7	307 9	307·1	306·2	305 6	305
Eng	date ...	Mar 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 1
1700	Mars ..	215 8	214 5	212 3	209·2	205·9	203 3	201 9	201 8	202 7	205 2	208 1	212 0	216 5	221·6	227·1	232 8	239 2	245
	Merc. .	11 5	27 1	37·4	38·8	32 0	29·1	36 1	49 8	66 2	84·3	103·0	121·3	138 0	151 9	158 9	158·2	150·5	149
	Jup ..	280 0	281 2	282 0	282 4	282 7	282·4	282 1	281 1	279 9	278·7	277·9	276 3	274·8	273·7	272·9	272·5	272·1	272
	Sat ..	319 1	320 1	321 0	322 0	322 5	323 1	323·6	323·6	323 5	323·5	323 0	323 5	323 0	321·2	320·4	319 6	318 9	318
Eng.	date ...	Mar 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 1
1701	Mars ..	27 8	34·8	41 6	48 6	55·4	62·2	69 0	75·6	82 0	88 7	95·4	101·8	108 2	114 7	121 1	127 5	133 7	140·
	Merc ..	16 4	20 3	14 4	9 5	14 3	27 3	43 5	61 8	80 8	99 2	116 5	131·4	141·3	142 4	135·4	131·8	138 2	151·
	Jup. .	309 5	310 9	312 9	314 3	315·5	316 4	317 3	317 5	317·7	317 3	316·8	315 9	314·6	313·4	312 1	310·5	309 3	308·
	Sat. .	330 3	331·4	332·5	333 6	334 3	335·1	335 8	336·0	336 3	336 5	336 2	336 0	335 6	334 9	334·9	333 4	332·6	331
1702	Mars	254·9	259·3	263 6	267 2	269 9	272 0	272 8	272 6	271 6	268·9	266 1	264 4	262·1	263 4	264 7	267·4	271·1	275·
	Merc. ..	357 2	359 8	353 6	5 3	20·9	38 9	57·7	76·4	94 3	110·3	121·7	125·2	119 7	114 4	118·7	130·5	145 9	163
	Jup. ..	337 1	339 3	341 6	343 7	345 7	347 8	349 3	350·8	352 2	353 0	353·7	354·0	353 9	353 6	352 8	351 8	350 6	349·
	Sat	341·6	342·8	344 0	345·2	346 2	347·1	348 1	348 6	349 2	349·6	349 5	349·5	349·4	348·8	348 3	347·7	346·9	346·
1703	Mars ...	42·4	48 9	55·5	62·1	68 7	75·2	81 7	88 1	94·6	100 9	107·3	113·7	120 2	126 6	132 9	139 3	145·7	152
	Merc	334 0	343 4	358 4	16·2	35 0	51·0	72·4	88·9	101 8	107 3	103·1	97·0	98 8	110 0	124 8	142·0	159·7	177·
	Jup. ..	4·9	7 3	9·7	12 9	14 5	16·7	18 9	21 0	22·9	24 9	26·5	27·8	29·1	29·8	30 4	30·5	30 1	29
	Sat. ...	353·3	354 6	355·9	357 2	358·3	359 4	0 5	1·2	1 9	2 7	2·9	3 1	3 3	2·9	2·6	2·2	1·4	0·
Eng.	date ...	Mar 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 1
1704	Mars ...	280·1	286·9	293·3	299·9	306 3	312·5	318 4	324 2	329·7	334 5	339 0	343 3	346·8	346 0	346·0	344·4	342 0	339
	Merc. .	346·7	353 6	12·0	30 9	49 5	66 6	80 6	88·4	86 2	79 1	79·5	89·0	102 8	120·5	138·5	156 3	172·9	188
	Jup. ...	32 1	34·6	36 9	39 1	41 7	43·8	46·2	48·8	51·0	53 3	55·2	57·4	59·1	60·9	62·5	63 7	64·6	65·
	Sat. ...	5·2	6·5	7·8	9·1	10 3	11·5	12·8	13 7	14 6	15·6	16 1	16·6	17 1	17·0	16 9	16·8	16·2	15·
Eng.	date ..	Mar 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 1
1705	Mars ..	57·3	63 3	69·6	75·6	81·7	88·1	94·4	100 6	106 8	113 0	119 5	125·7	132 1	138·4	144·7	151·0	157·5	164·
	Merc ..	349·3	8·2	26·8	44 1	59 1	68·5	68·7	61 5	59 7	67 7	81 7	98·6	116·6	134·9	152·4	168 0	180·7	186·
	Jup. ...	61 0	61·9	63·9	66 0	67 9	70·1	72 5	74 7	77·1	79 4	81·6	83 9	86 2	88·5	90 5	92·4	94·1	95·
	Sat. ...	17·3	18·6	19·9	19 3	22 6	23 9	25·3	26 4	27·5	28·6	29·3	30·0	30 7	31 0	31·3	31·4	31·1	30·
1706	Mars ..	300·2	307·7	315·2	322·3	330·0	337·2	344·7	351·6	358·6	5 4	11 7	18 2	24·0	29·8	35·0	39·4	43·5	46·
	Merc. .	4·2	21·9	37·4	48·0	50·3	43 5	40 0	46 3	59·9	76 3	94·5	113 1	131·1	147·7	161 6	169 1	167·9	160·
	Jup. ...	89·4	90·2	91·4	93·1	94·3	96·2	98 0	100·2	102·3	104·5	106 7	109 1	111 3	113·5	115·8	117·9	120 0	122·
	Sat. ...	29·7	31·0	32 3	33·5	34·9	36·3	37·7	38·9	40·1	41 4	42·4	43·3	44·3	44 7	45·1	45 6	45·6	45

Mesh.	Vrsh.	Mith.	Kat.	Sim.	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asle
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·6	120

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999, Mercury, A.D. 1645—A.D. 1999, Jupiter, A.D. 1656—A.D. 1999, Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260	270		280	290	300	310	320	330	340	350	360
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
89·0	93·9	98·5	102·4	105·8	108·4	110·3	110·9	110·3	108·1	**1694**	105·1	101·4	97·6	94·5	92·6	91·9	92·5	94·3	96·9
157·9	167·8	182·3	198·6	216·0	233·2	249·3	262·9	271·1	270·2		262·8	260·8	268·1	281·6	298·0	316·0	334·3	352·4	8·7
93·0	93·8	94·1	94·9	94·6	93·9	93·4	92·6	90·7	90·0		88·7	87·4	86·3	85·3	84·4	84·1	83·9	84·2	84·9
237·2	238·1	239·0	239·9	241·0	242·1	243·3	244·5	245·7	246·8		247·9	248·9	250·0	250·8	251·7	252·5	252·9	253·3	253·7
201·9	208·5	215·4	222·7	229·8	237·1	244·5	252·1	259·6	267·3	**1695**	275·1	282·8	290·5	298·4	306·2	314·2	322·2	329·9	337·9
161·9	178·1	195·5	212·7	229·3	243·7	253·5	255·3	248·8	244·4		249·1	261·3	276·8	294·3	312·5	330·3	347·2	0·9	8·9
120·3	121·9	123·3	124·6	125·5	126·2	126·6	126·6	126·5	125·8		124·8	123·9	122·6	121·3	120·0	118·6	117·5	116·8	116·2
247·5	248·3	249·1	249·8	250·9	251·9	253·0	254·2	255·4	256·5		257·7	258·8	259·9	260·9	261·8	262·8	263·3	263·9	264·5
																	Mr 3	Mr 13	Mr 23
106·4	112·1	117·2	122·4	127·2	131·6	135·5	138·5	141·4	143·0	**1696**	143·9	142·7	140·7	137·7	133·7	130·3	127·0	124·6	124·1
174·3	191·9	209·2	224·2	235·9	239·8	235·8	229·0	231·1	241·5		256·1	272·9	290·8	308·0	325·6	339·8	349·4	349·8	342·8
145·4	147·5	149·4	151·1	152·6	154·0	155·2	156·3	157·0	157·5		157·4	157·1	156·7	155·7	154·4	153·1	152·1	150·5	149·5
258·0	258·6	259·2	259·9	260·9	261·9	262·9	264·1	265·3	266·4		267·5	268·8	269·9	270·9	271·9	273·0	273·8	274·5	275·2
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
216·1	223·3	230·3	237·7	245·1	252·5	260·2	267·8	275·5	283·3	**1697**	291·1	299·1	306·9	314·7	322·6	330·5	338·4	346·0	353·7
188·8	204·6	217·6	224·1	222·2	214·3	213·6	221·4	236·0	252·1		269·5	287·4	304·4	319·4	329·8	332·5	325·9	321·5	326·4
168·9	171·0	173·4	175·2	177·5	179·5	181·1	182·8	184·1	185·5		186·4	187·0	187·5	187·5	187·2	186·7	185·7	184·7	183·4
268·4	269·3	269·8	270·3	271·2	272·1	273·0	274·0	275·0	276·0		277·2	278·4	279·5	280·6	281·8	282·9	283·9	284·8	285·7
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
120·8	126·7	132·4	138·1	143·5	148·5	153·9	158·7	163·1	167·3	**1698**	170·6	173·4	175·5	176·2	176·2	174·3	171·3	167·6	163·7
198·7	207·5	207·9	200·3	197·2	203·4	216·2	231·9	248·9	266·4		283·4	298·9	310·6	315·0	310·1	303·9	307·1	318·7	334·1
192·2	194·7	196·9	198·8	201·0	203·7	205·3	207·6	209·5	211·3		212·9	214·5	215·7	216·6	217·3	217·8	217·3	217·8	217·2
280·2	280·4	280·7	281·1	281·8	282·9	282·3	284·4	285·5	286·5		287·7	288·9	290·2	291·4	292·6	293·7	294·7	295·7	296·7
232·8	239·8	247·1	254·4	261·8	269·3	277·0	284·7	292·4	300·2	**1699**	308·0	315·7	323·5	331·2	338·9	346·6	354·1	1·6	9·0
192·9	186·9	181·4	185·6	196·7	211·6	227·9	245·7	262·8	278·7		291·4	297·7	294·8	287·6	288·1	297·8	312·2	329·7	348·1
216·8	218·5	220·7	223·0	225·1	227·1	229·6	231·8	233·8	236·3		238·3	240·2	242·1	244·0	245·5	246·8	247·8	248·5	249·3
292·0	291·1	292·2	292·2	292·8	293·4	294·0	295·0	296·0	296·9		298·1	299·3	300·4	301·6	302·8	304·1	305·3	306·4	307·6
																	Mr 3	Mr 13	Mr 23
134·0	139·9	146·0	152·0	157·8	163·6	169·2	174·9	180·4	185·8	**1700***	190·9	195·6	200·3	205·0	208·2	211·4	213·9	215·5	216·2
166·0	167·2	177·2	191·3	207·7	225·1	242·2	258·6	272·0	280·3		279·8	272·2	270·2	278·0	291·4	307·8	325·9	344·4	2·5
242·9	244·3	246·1	248·3	250·1	252·3	254·5	256·8	259·1	261·4		263·6	266·0	268·2	270·3	272·4	274·4	276·4	278·0	279·4
304·6	304·4	304·2	304·0	304·4	304·7	305·2	306·1	306·9	307·8		308·9	310·0	311·1	312·4	313·7	314·9	316·2	317·4	318·5
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
252·4	259·3	266·4	273·6	280·8	288·2	295·6	303·1	310·7	318·2	**1701**	325·6	333·2	340·5	347·9	355·3	2·5	9·9	16·9	24·0
157·6	171·3	187·4	204·7	222·1	238·3	252·9	263·0	264·4	257·8		253·1	258·7	270·7	286·3	303·8	323·2	340·1	357·2	11·4
272·4	273·6	274·5	275·5	277·2	278·9	280·9	283·0	285·0	287·4		289·7	291·9	294·2	296·8	299·0	301·6	303·8	306·0	307·7
317·4	317·1	316·7	316·3	316·5	316·6	316·9	317·5	318·2	318·9		320·0	321·1	322·1	323·3	324·5	325·8	327·1	328·4	329·6
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
146·2	152·5	158·7	164·9	171·1	177·3	183·4	189·5	195·5	201·8	**1702**	207·6	213·6	219·7	225·3	231·1	236·7	242·1	247·3	252·9
166·8	183·9	201·6	218·3	233·5	244·8	249·0	244·2	237·8	240·1		250·9	265·5	282·6	300·5	318·4	335·5	350·1	0·0	0·5
307·5	307·1	307·1	307·3	308·0	308·7	309·9	311·5	313·0	314·9		317·0	319·2	321·4	323·9	326·2	328·6	331·0	333·2	335·8
331·0	330·5	330·0	329·4	329·3	329·2	329·2	329·7	330·2	330·7		331·7	332·7	333·5	334·7	335·9	337·1	338·4	339·7	341·0
280·4	285·8	291·8	298·0	304·4	310·9	317·4	324·1	331·0	337·7	**1703**	344·7	351·5	358·4	5·2	12·0	18·6	25·5	32·1	38·8
180·3	193·0	213·8	226·5	238·3	231·0	223·4	222·7	231·3	245·3		261·6	279·4	297·0	314·1	329·1	339·9	342·8	336·5	332·1
347·9	346·6	345·2	344·3	343·8	343·4	343·4	343·8	344·5	345·3		346·8	348·4	349·2	351·9	354·0	356·2	358·6	1·0	3·3
345·2	344·5	343·8	343·0	342·7	342·4	342·1	342·4	342·7	343·0		343·7	344·5	345·3	346·4	347·5	348·6	349·9	351·2	352·5
																	Mr 3	Mr 13	Mr 23
158·4	164·8	171·2	177·7	184·1	190·6	197·0	203·5	210·1	216·5	**1704**	223·2	229·8	236·5	243·1	250·2	256·5	263·1	269·9	276·7
194·0	207·9	216·8	216·6	209·4	205·7	212·8	225·3	241·0	258·3		275·8	293·0	308·5	320·4	325·2	320·2	314·4	317·0	328·5
28·8	27·6	26·6	25·2	23·8	22·7	21·3	20·5	19·8	19·7		19·8	20·4	21·0	22·2	23·7	25·2	27·0	29·0	31·7
0·0	359·2	358·4	357·5	356·9	356·4	355·9	355·9	355·9	355·9		356·5	357·1	357·7	358·7	359·6	0·7	1·9	3·1	4·4
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
337·6	336·5	336·6	338·0	340·5	343·7	347·5	351·8	356·5	1·5	**1705**	6·9	12·4	18·0	23·9	29·6	35·7	41·7	47·7	53·8
199·1	201·9	195·7	190·7	194·5	205·7	220·4	237·4	254·9	272·2		288·0	301·0	307·4	304·4	297·8	298·1	307·7	322·4	339·6
65·5	65·6	65·1	64·5	63·6	62·5	61·1	59·7	58·5	57·3		56·1	55·5	54·9	54·9	55·3	55·8	56·7	58·0	59·3
15·0	14·2	13·4	12·5	11·8	11·1	10·4	10·1	9·8	9·5		9·8	10·2	10·5	11·4	12·2	13·0	14·2	15·4	16·6
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
170·5	177·1	183·8	190·4	197·1	203·8	210·5	217·3	224·4	231·2	**1706**	238·3	245·3	252·4	259·7	266·9	274·2	281·6	288·9	296·3
184·5	175·2	176·4	186·4	200·5	217·0	234·3	251·6	268·6	281·4		289·8	289·2	281·9	279·5	287·4	300·9	317·6	335·8	354·3
96·8	97·7	98·7	99·0	99·3	98·9	98·5	97·6	96·4	95·2		93·9	92·6	91·3	90·2	89·2	88·7	88·5	88·5	89·0
30·2	29·4	28·7	28·0	27·1	26·3	25·5	24·9	24·4	23·8		23·9	23·9	23·9	24·6	25·3	25·9	26·9	28·0	29·0
43·0	50·0	50·0	48·8	46·1	43·0	40·0	37·9	36·7	36·7	**1707**	38·0	40·0	42·9	46·4	50·5	54·8	59·6	64·7	69·8
158·8	166·7	180·6	196·6	213·8	231·1	247·7	262·2	272·0	273·8		267·2	262·9	267·7	280·3	296·1	313·9	332·2	350·3	7·3
123·8	125·7	127·2	128·5	129·5	130·4	130·9	131·0	130·7	130·5		129·6	128·5	127·3	126·2	124·8	123·5	122·3	121·5	120·8
45·3	44·7	44·1	43·5	42·6	41·8	40·9	40·2	39·5	38·5		38·6	38·3	38·1	38·4	38·7	39·1	39·9	40·8	41·7

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U Ash.	Śrav.	Dan	Satab.	P Bhad.	U. Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

* The year A.D. 1700 was a leap year in the British Isles but not in continental countries other than Russia.

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle.
Venus, A.D. 1765—A.D. 1999;

Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
Eng. date	Mar 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Jl 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1707 Mars	72·6	78·3	83·8	89·5	95·3	101·2	107·2	113·1	119·2	125·3	131·4	137·8	144·0	150·5	156·7	163·3	169·9	176·8
Merc.	15·1	27·2	31·1	25·1	20·5	25·4	37·6	53·8	72·0	90·7	109·2	126·5	141·5	150·7	151·9	144·7	141·6	148·1
Jup	120·4	120·4	120·4	121·0	121·9	123·0	124·3	125·8	127·5	129·4	131·2	133·2	135·4	137·8	139·8	142·3	144·5	146·4
Sat.	42·4	43·7	45·0	46·2	47·5	48·8	50·2	51·5	52·8	54·1	55·3	56·4	57·5	58·3	59·0	59·7	59·9	60·1
Eng date	Mar 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1708 Mars	318·5	326·2	334·1	341·5	349·2	356·7	4·3	11·5	18·8	25·9	32·9	39·7	46·2	52·7	58·8	64·8	70·5	75·7
Merc.	12·0	8·4	1·9	4·6	15·8	31·3	49·4	68·1	87·2	104·1	120·5	132·3	135·4	129·7	124·4	128·7	140·3	155·4
Jup.	153·5	152·5	151·5	151·1	150·9	150·9	151·5	152·1	153·1	154·4	156·1	157·8	159·5	161·6	163·4	165·7	167·7	169·9
Sat.	55·3	56·5	57·7	58·8	60·1	61·4	62·7	64·0	65·4	66·8	68·1	69·3	70·5	71·4	72·4	73·4	73·8	74·2
Eng. date	Mar 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1709 Mars	90·5	94·8	99·4	104·5	109·8	115·2	120·7	126·4	132·3	138·3	144·3	150·4	156·9	163·0	169·4	176·0	182·7	189·4
Merc.	345·9	344·2	353·8	8·8	26·4	45·3	64·3	82·6	99·1	112·1	117·9	114·0	107·2	109·1	119·9	134·6	151·5	169·2
Jup.	187·4	186·1	184·8	183·7	182·7	181·7	181·2	181·0	180·9	181·5	182·4	183·1	184·5	186·0	187·7	189·4	191·5	193·6
Sat.	68·6	69·5	70·5	71·5	72·7	74·0	75·2	75·6	77·9	79·2	80·5	81·8	83·2	84·3	85·4	86·5	87·2	88·0
1710 Mars	335·6	343·3	351·1	358·7	6·3	13·7	21·3	28·3	35·7	42·7	49·6	56·4	63·2	69·7	70·1	82·3	88·5	94·3
Merc.	332·9	346·6	3·7	22·3	41·2	60·0	77·1	91·2	99·0	97·2	90·0	89·6	99·3	113·4	130·3	148·0	165·8	183·0
Jup.	221·4	220·5	219·3	218·0	217·0	215·5	214·2	213·1	212·2	211·9	211·5	211·7	211·9	212·6	213·8	214·8	216·4	218·0
Sat.	82·2	83·0	83·7	84·4	85·5	86·6	87·8	89·0	90·4	91·7	93·0	94·3	95·7	97·0	98·2	99·4	100·3	101·2
1711 Mars	113·1	115·8	118·3	122·2	126·3	131·0	135·8	141·2	146·7	152·4	158·3	164·2	170·5	176·8	183·2	189·9	196·5	203·4
Merc.	341·4	359·5	18·5	37·0	54·8	69·7	76·9	79·5	72·3	70·8	79·0	92·0	108·5	125·7	144·8	162·0	177·9	190·1
Jup.	253·9	254·1	253·7	253·4	252·5	251·4	250·4	248·8	247·4	246·2	245·0	244·1	243·5	243·3	243·2	243·7	244·5	245·4
Sat.	95·9	96·3	96·8	97·3	98·3	99·3	100·1	101·3	102·5	103·8	105·2	106·5	107·8	109·1	110·8	111·6	112·6	113·7
Eng. date	Mar 28	Ap 7	Ap 17	Ap 27	My 7	My 17	My 27	Je 6	Je 16	Je 26	Jl 6	Jl 16	Jl 26	Au 5	Au 15	Au 25	S 4	S 14
1712 Mars	351·7	359·4	6·9	14·5	21·8	29·2	36·4	43·7	50·5	57·7	64·3	71·1	77·7	84·3	90·8	97·1	103·3	109·3
Merc.	355·7	14·4	32·2	47·7	58·6	61·3	54·9	51·1	57·2	70·2	86·6	104·6	122·9	141·0	157·2	171·0	178·7	177·2
Jup	284·1	285·5	286·4	287·0	287·4	287·5	287·0	286·3	285·5	284·2	283·0	281·6	280·3	278·9	278·0	277·3	276·7	276·8
Sat.	109·7	109·9	110·0	110·3	111·1	111·8	112·5	113·6	114·7	115·8	117·1	118·4	119·6	120·9	122·2	123·6	124·7	125·9
Eng. date	Mar 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1713 Mars	145·1	144·0	144·2	145·6	148·0	151·0	154·7	159·1	163·8	169·1	174·6	180·3	186·2	192·5	198·9	205·4	212·1	219·4
Merc	9·8	25·9	37·9	42·5	37·2	31·8	36·1	48·3	64·3	82·3	100·9	119·3	136·4	151·1	160·9	162·0	154·9	151·3
Jup.	312·9	314·9	316·7	318·5	319·9	321·1	322·0	322·5	322·8	322·5	321·9	321·2	320·2	318·9	317·5	316·3	314·8	313·7
Sat.	123·6	123·5	123·8	123·3	123·8	124·4	124·9	125·8	126·7	127·6	128·8	130·0	131·3	132·6	133·9	135·1	136·3	137·5
1714 Mars	7·1	14·5	21·9	29·1	36·4	43·6	50·5	57·5	64·5	71·1	77·8	84·5	91·0	97·5	104·0	110·4	116·6	122·7
Merc.	16·7	23·1	19·3	12·9	14·8	26·2	41·7	59·7	78·4	96·9	114·7	130·5	142·1	145·8	140·1	134·3	138·2	149·6
Jup.	341·1	343·4	345·7	347·9	350·0	351·9	353·6	355·4	356·7	357·7	358·4	358·9	359·1	358·7	358·2	357·3	356·1	354·7
Sat.	137·4	137·0	136·7	136·5	136·7	137·0	137·2	138·0	138·8	139·4	140·5	141·6	142·8	144·0	145·2	146·5	147·8	149·1
1715 Mars	194·6	191·5	187·8	185·2	183·3	182·8	183·5	185·4	188·3	192·0	196·1	200·9	206·3	211·9	217·9	224·1	230·6	237·2
Merc.	1·7	354·4	354·9	4·4	19·4	36·8	54·9	73·9	92·0	109·4	121·4	127·7	124·1	117·4	119·5	129·6	144·4	161·1
Jup	8·7	11·1	13·5	15·8	18·2	20·6	22·8	24·9	26·9	28·8	30·7	32·2	33·3	34·4	35·0	35·1	35·2	35·0
Sat	151·0	150·5	150·0	149·4	149·4	149·5	149·4	150·0	150·6	151·0	152·0	152·9	153·9	155·0	156·2	157·4	158·7	160·0
1716 Mars	22·1	29·2	36·3	43·3	50·2	57·1	63·9	70·6	77·4	83·9	90·6	97·0	103·5	110·0	116·4	122·7	129·0	135·2
Merc.	335·4	343·0	356·9	14·2	32·8	51·9	70·4	87·6	101·4	109·5	107·9	100·7	100·3	109·1	123·4	140·0	157·8	175·3
Jup	36·0	38·3	40·6	42·9	45·1	47·7	50·1	52·2	54·5	57·0	59·1	61·2	63·1	64·8	66·4	67·9	68·9	69·7
Sat.	164·4	163·7	163·0	162·4	162·1	161·9	161·7	161·9	162·2	162·5	163·3	164·1	164·9	166·0	167·1	168·2	169·4	170·6
1717 Mars	242·0	244·8	246·6	247·5	247·7	246·6	243·9	241·7	239·3	237·6	236·9	237·1	239·6	242·5	246·5	251·0	256·3	261·8
Merc.	335·2	351·5	9·6	28·6	48·0	65·1	80·2	90·0	90·7	83·4	80·9	88·4	102·0	118·5	136·2	154·1	171·6	187·3
Jup.	65·1	65·7	67·6	69·4	71·5	73·6	76·0	78·2	80·6	82·9	85·2	87·5	89·8	91·9	93·9	95·8	97·6	99·3
Sat	177·4	176·6	175·9	175·1	174·7	174·3	173·8	173·9	174·0	174·0	174·5	175·1	175·8	176·7	177·6	178·6	179·8	181·0
1718 Mars	36·7	43·4	50·2	56·9	63·6	70·2	76·8	83·3	89·7	96·4	102·8	109·1	115·6	121·9	128·3	134·6	141·0	147·4
Merc.	347·2	5·8	24·7	42·7	58·5	69·8	72·6	66·4	61·8	68·0	80·4	96·6	114·5	132·7	150·6	166·3	180·5	188·0
Jup	93·6	94·4	95·3	96·6	98·2	99·8	101·9	103·9	106·0	108·0	110·4	112·4	114·7	116·9	119·1	121·3	123·4	125·7
Sat.	190·0	189·2	188·4	187·6	187·1	186·6	185·9	185·8	185·7	185·4	185·8	186·2	186·0	186·8	188·2	189·1	190·2	191·3
1719 Mars	271·3	277·2	283·2	288·9	294·3	299·7	304·3	308·6	312·1	314·9	316·7	316·7	316·0	313·9	311·4	309·3	308·2	308·0
Merc.	1·8	20·0	36·2	48·3	53·4	48·9	42·8	46·9	58·6	74·4	92·2	110·9	129·0	146·0	161·4	170·5	171·5	164·7
Jup	124·8	124·6	124·7	124·9	125·6	126·5	128·0	129·2	130·9	132·7	134·7	136·7	138·9	141·1	143·0	145·3	147·5	148·9
Sat.	202·4	201·6	200·8	200·1	199·4	198·7	198·0	197·7	197·3	196·9	197·1	197·3	197·5	198·2	198·9	199·5	200·5	201·5
1720 Mars	51·4	57·8	64·1	70·5	76·7	83·1	89·4	95·6	102·1	108·4	114·7	121·1	127·3	134·0	140·2	146·5	152·9	159·2
Merc.	14·1	27·5	33·8	30·6	23·9	26·0	36·7	52·2	69·9	88·7	107·1	124·8	140·4	151·7	155·3	149·8	144·1	147·9
Jup	158·1	157·1	156·2	155·3	155·2	155·5	155·8	156·0	157·0	158·0	159·4	161·0	163·0	164·9	166·6	168·7	171·1	173·2
Sat.	214·4	213·7	213·0	212·2	211·4	210·6	209·9	209·4	209·0	208·5	208·4	208·3	208·3	208·8	209·3	209·8	210·7	211·6
1721 Mars	292·7	299·9	307·1	314·3	321·4	328·4	335·4	342·1	348·8	355·1	1·1	6·8	12·1	16·9	20·9	24·2	26·2	27·1
Merc.	14·0	12·9	5·7	5·8	15·0	29·7	47·3	65·9	84·8	103·1	119·4	132·3	138·2	134·6	128·1	129·0	139·5	153·6
Jup.	192·2	190·8	189·4	188·1	187·2	186·3	185·4	185·3	185·2	185·4	186·1	187·0	188·2	189·4	191·1	192·9	194·8	196·6
Sat.	226·0	225·4	224·8	224·2	223·4	222·6	221·9	221·2	220·6	219·9	219·7	219·5	219·3	219·6	219·9	220·2	220·9	221·7

Mesh.	Vrsh.	Mith.	Kat.	Sim.	Kan.	Tul.	Vrsch	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·6	120·0

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260	270		280	290	300	310	320	330	340	350	360
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 3	Mr 13	Mr 23
182·9	189·6	196·4	203·4	210·3	217·3	224·3	231·4	238·7	246·1	**1708**	253·4	260·8	268·3	276·0	283·5	291·3	298·9	306·7	314·5
160·5	176·2	193·2	210·7	227·4	242·6	254·1	258·1	253·0	246·9		249·7	260·2	275·0	292·0	310·1	328·4	345·2	0·8	10·3
148·8	150·8	152·8	154·6	156·2	157·8	158·9	160·2	160·8	161·4		161·6	161·2	160·8	160·0	159·1	157·9	156·7	155·3	154·0
60·2	59·8	59·5	59·0	58·2	57·5	56·7	55·9	55·1	54·3		53·8	53·3	52·8	52·8	52·9	52·9	53·6	54·3	54·9
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D 13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
80·6	85·1	88·9	92·4	94·7	96·1	96·5	95·3	93·1	89·9	**1709**	85·8	82·6	79·8	78·8	78·3	79·7	81·8	84·7	88·5
171·7	189·2	207·4	223·0	235·8	242·1	240·0	232·3	231·5	240·7		254·5	270·9	288·7	306·5	323·8	339·2	350·4	353·2	347·2
172·0	174·2	176·4	178·7	180·8	182·5	184·6	186·2	187·7	189·0		190·2	190·9	191·4	191·7	191·5	191·0	190·4	189·3	188·1
74·7	74·6	74·4	74·4	73·7	73·0	72·5	71·6	70·7	69·9		69·2	68·5	67·7	67·5	67·3	67·1	67·5	67·8	68·3
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
196·1	203·0	210·0	217·1	224·3	231·4	238·7	246·1	253·6	261·2	**1710**	268·8	276·5	284·4	292·0	300·1	307·7	315·5	323·5	331·5
186·9	203·3	217·1	225·5	225·7	218·3	215·3	221·6	234·4	250·3		267·5	285·4	302·8	318·3	330·4	335·2	330·8	324·5	327·4
195·7	197·7	200·1	202·2	204·2	206·7	208·8	210·9	212·6	214·7		216·3	217·9	219·5	220·5	221·3	221·8	222·1	222·3	221·5
88·7	88·8	88·9	89·0	88·7	88·3	87·8	87·0	86·2	85·5		84·7	83·9	83·0	82·6	82·2	81·6	81·7	81·7	81·8
99·9	105·5	110·5	115·3	119·6	123·6	127·1	129·4	130·7	131·1	**1711**	130·3	128·1	125·1	121·8	117·2	114·2	112·2	111·7	112·2
197·7	208·3	210·9	205·1	199·5	208·1	214·8	230·0	246·7	264·2		281·5	297·5	310·5	317·3	314·9	307·8	307·7	317·8	332·3
220·0	221·9	224·1	226·0	228·4	230·6	232·7	235·2	237·3	239·5		241·7	243·7	245·6	247·5	249·3	250·6	251·8	152·4	253·6
102·1	102·5	102·9	103·3	103·1	103·0	102·9	102·2	101·6	100·9		100·0	99·1	98·3	97·7	97·0	96·8	96·2	95·9	95·8
																	Mr 3	Mr 13	Mr 23
210·3	217·2	224·4	231·6	238·9	246·5	253·9	261·8	269·2	277·0	**1712**	284·9	292·6	300·5	308·5	316·3	324·2	332·1	339·9	347·8
195·3	191·4	184·5	185·9	195·8	209·8	226·1	243·6	260·8	277·2		290·9	299·3	299·3	291·4	289·3	297·3	310·3	327·5	345·9
246·7	248·2	249·7	251·7	253·6	255·7	258·0	260·2	262·5	264·9		267·1	269·4	271·7	274·0	276·0	278·8	280·2	281·9	283·4
114·4	115·4	116·1	116·8	116·9	117·0	117·1	116·3	116·2	115·4		115·0	114·2	113·5	112·7	111·9	111·0	110·6	110·2	109·7
S 24	O 4	O 14	O 24	N 3	N 13	N 23	D 3	D13	D 23		Ja 2	Ja 12	Ja 22	F 1	F 11	F 21	Mr 3	Mr 13	Mr 23
115·3	121·2	126·8	132·4	137·6	142·5	147·2	151·5	155·4	158·6	**1713**	161·2	162·7	163·1	162·2	159·9	156·4	152·6	148·9	146·1
169·8	167·6	176·3	189·8	205·8	223·1	240·1	256·9	271·3	281·2		283·2	276·8	272·3	277·5	289·9	305·8	323·7	342·2	0·3
277·1	277·5	278·6	279·6	281·3	282·9	284·7	286·7	288·8	291·1		293·5	295·7	297·8	300·5	302·6	305·0	307·3	309·8	311·9
127·0	127·9	129·7	129·6	130·0	130·3	130·7	130·6	130·4	130·1		129·4	128·7	128·1	127·3	126·6	125·8	125·2	124·5	123·9
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
226·0	233·0	240·3	247·6	255·1	262·7	270·3	277·8	285·8	293·5	**1714**	301·3	309·2	317·0	324·8	332·5	310·3	348·0	355·6	3·1
157·3	170·0	186·6	202·5	220·0	236·7	251·8	263·1	267·7	262·5		256·2	258·8	269·6	284·5	301·8	320·0	338·2	355·6	10·7
312·9	312·2	312·0	312·2	312·5	313·1	314·2	315·6	317·0	318·8		320·8	323·0	325·3	327·6	329·7	332·3	334·7	337·4	339·6
138·8	139·8	140·8	141·8	142·6	143·1	143·6	143·6	143·7	143·7		143·2	142·8	142·3	141·5	140·7	139·9	139·2	138·5	137·7
128·9	134·9	140·8	146·7	152·4	158·2	163·4	168·9	174·1	178·8	**1715**	183·6	187·7	191·6	194·8	197·1	198·9	199·1	198·5	196·3
164·9	181·9	199·3	216·4	232·1	244·7	251·1	248·8	241·1	240·9		250·1	263·8	280·3	298·1	316·4	338·6	349·2	0·7	4·1
353·6	352·0	349·8	349·7	348·8	348·3	348·3	348·4	349·1	350·0		351·0	352·5	354·2	356·1	358·0	0·4	2·7	4·7	6·4
150·8	151·4	152·8	153·6	154·3	155·0	155·8	156·1	156·4	156·7		156·4	156·1	155·9	155·2	154·5	153·8	153·0	152·2	151·4
																	Mr 3	Mr 13	Mr 23
244·1	251·2	258·8	265·7	273·1	280·6	288·3	295·9	303·5	311·1	**1716**	319·4	326·4	333·9	341·5	348·9	356·4	3·7	10·9	18·2
177·9	196·0	212·4	226·0	234·8	234·7	227·7	223·9	230·8	248·8		259·6	277·1	294·9	312·3	328·2	340·2	345·8	341·3	335·3
34·2	33·1	32·1	30·6	29·2	27·9	26·7	25·8	25·0	24·7		24·5	25·0	25·7	26·5	27·9	29·4	31·0	32·9	35·0
161·2	162·3	163·4	164·6	165·5	166·5	267·4	167·8	168·3	168·8		168·7	168·8	168·7	168·1	167·6	167·1	166·3	165·5	164·7
																	Mr [illegible]	Mr 14	Mr 24
141·5	147·7	153·9	159·9	166·0	172·1	178·1	183·9	189·9	195·7	**1717**	201·5	206·9	212·4	217·8	222·8	227·9	232·4	236·5	240·3
192·2	207·0	217·4	220·0	213·7	208·6	212·5	224·1	239·3	256·2		273·7	291·2	307·3	320·4	327·3	324·8	317·8	318·2	327·8
70·3	70·3	70·2	69·9	69·0	67·8	66·3	65·2	63·8	62·4		61·3	60·5	60·0	59·6	59·8	60·1	61·0	62·1	63·4
171·8	173·0	174·2	175·4	176·4	177·4	178·5	179·1	179·7	180·5		180·7	180·9	181·0	180·6	180·3	180·0	179·2	178·4	177·8
267·7	274·1	280·6	287·4	294·3	301·2	308·4	315·4	322·6	329·8	**1718**	336·9	344·2	351·3	358·1	5·3	12·3	19·3	26·2	33·1
189·3	204·5	200·4	193·6	194·7	204·7	219·0	235·4	252·9	270·3		286·7	300·6	308·9	308·8	301·6	299·4	306·9	320·8	337·5
100·3	102·0	102·9	103·3	103·5	103·7	103·1	102·6	101·6	100·3		98·9	97·6	96·8	95·2	94·3	93·4	93·1	92·8	93·3
182·1	183·3	184·5	185·8	186·9	188·0	189·1	189·9	190·7	191·5		192·0	192·3	192·7	192·5	192·3	192·2	191·6	191·0	190·5
153·7	160·1	166·4	172·6	179·1	185·4	191·7	198·1	204·5	210·8	**1719**	217·3	223·6	230·0	236·4	242·8	249·1	255·5	261·7	268·0
186·6	178·0	177·4	185·9	198·9	215·1	232·1	249·6	266·0	280·3		291·1	292·8	286·4	281·8	287·4	299·6	315·7	333·4	352·1
127·6	129·1	130·9	132·2	133·4	134·2	135·1	135·4	135·1	135·0		134·2	133·3	132·0	130·8	129·5	128·2	127·0	125·8	125·0
192·4	193·6	194·8	195·9	197·1	198·1	199·4	200·2	201·2	202·2		202·7	203·7	203·9	203·9	204·0	204·6	203·8	203·6	202·8
																	Mr 3	Mr 13	Mr 23
309·3	311·6	315·2	319·0	323·7	328·8	333·9	339·7	345·4	351·5	**1720**	357·6	3·8	10·0	16·3	22·5	28·9	35·2	41·7	48·0
160·6	163·9	179·0	194·9	211·7	229·0	245·8	261·0	272·5	276·6		272·1	265·5	268·4	278·8	294·2	311·5	329·7	348·2	5·4
151·8	153·8	156·0	157·9	159·7	161·2	162·8	163·9	164·8	165·3		165·6	165·7	165·2	164·7	163·8	162·6	161·3	160·1	158·7
202·5	203·7	204·9	206·0	207·2	208·4	209·5	210·5	211·5	212·6		213·2	213·9	214·7	215·0	215·2	215·5	215·3	214·9	214·7
																	Mr 4	Mr 14	Mr 24
165·8	172·3	178·7	185·4	191·9	198·7	205·2	211·9	218·7	225·6	**1721**	232·5	239·4	246·3	253·4	260·3	267·5	274·6	281·8	289·0
159·2	174·3	191·2	208·6	225·8	241·4	253·9	260·3	257·6	250·2		250·4	259·2	273·4	290·3	308·0	326·4	343·8	359·5	11·1
175·2	177·4	179·8	181·7	183·8	186·0	187·9	189·7	191·2	192·2		193·8	194·8	195·3	195·8	195·8	195·3	194·7	193·9	192·7
212·4	213·5	214·6	215·8	217·0	218·3	219·4	220·5	221·6	222·7		223·6	224·4	225·3	225·7	226·1	226·4	226·5	226·6	226·2
26·6	24·9	22·5	19·6	17·8	16·5	15·8	16·5	18·4	21·0	**1722**	24·0	27·9	32·1	36·8	41·8	46·9	52·3	57·8	63·3
170·4	187·5	205·3	221·6	235·2	243·7	241·6	236·1	233·2	239·8		253·1	269·0	286·6	304·5	322·2	338·1	350·7	356·0	352·4
198·7	201·1	204·1	205·3	207·7	209·7	212·1	214·2	216·1	218·1		219·9	221·5	223·2	224·3	225·2	226·1	226·4	226·5	226·2
222·4	223·5	224·5	225·5	226·7	127·9	229·0	230·1	231·2	232·4		233·4	234·4	235·4	235·9	236·5	237·2	237·3	237·4	237·5

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula	P. Ash.	U. Ash.	Śrav.	Dan.	Satab.	P. Bhad.	U. Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle. Venus, A.D. 1765—A.D. 1999;

Year	Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ...	Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	A 6	A 16	A 26	S 5	S 15
1722	Mars ...	66.4	72.2	78.0	83.9	90.0	96.0	102.1	108.2	114.3	120.4	126.8	133.0	139.4	145.6	152.1	158.6	164.9	171.6
	Merc.	348.1	345.7	353.0	7.1	24.3	42.8	62.0	80.5	97.7	111.9	120.1	118.6	110.8	110.2	119.2	132.9	149.6	167.1
	Jup.	226.0	225.1	224.1	222.8	221.6	220.2	219.0	217.8	217.0	216.1	215.8	215.8	216.2	216.6	217.5	218.7	220.2	221.9
	Sat.	237.4	237.2	236.9	236.0	235.2	234.5	233.7	233.0	232.3	231.5	231.1	230.7	230.3	230.5	230.6	230.7	231.3	231.9
1723	Mars ..	311.5	319.2	326.8	334.5	342.0	349.6	356.8	4.2	11.5	18.5	25.8	32.1	38.4	44.6	50.7	56.2	60.9	66.2
	Merc. ...	332.8	345.2	1.8	20.1	39.1	58.1	75.5	90.6	100.7	101.2	94.1	91.5	98.7	111.8	128.2	143.7	163.7	181.0
	Jup.	258.1	258.3	258.5	258.0	257.5	256.5	255.8	253.9	252.5	251.8	250.1	248.9	248.3	247.9	247.6	248.0	248.4	249.3
	Sat	248.6	248.3	248.1	247.7	247.0	246.4	245.7	245.0	244.2	343.5	242.8	242.2	242.7	241.6	241.5	241.4	241.8	242.2
1724	Mars ...	82.8	88.0	93.0	98.4	103.8	109.4	115.3	121.1	127.1	133.1	139.2	145.5	151.7	158.1	164.5	171.0	177.5	184.2
	Merc	339.5	357.4	16.1	35.0	53.0	68.9	80.1	83.5	77.2	72.8	78.3	90.7	106.7	124.3	142.8	160.3	176.5	189.7
	Jup.	288.1	289.7	290.7	291.7	292.0	292.4	292.1	291.4	290.6	289.7	288.3	287.0	285.6	284.4	283.8	282.3	281.8	281.3
	Sat. ...	259.6	259.5	259.4	259.3	258.7	258.1	257.5	256.7	255.9	255.1	254.5	253.9	253.2	253.0	252.8	252.4	252.6	252.9
1725	Mars ...	328.9	336.7	344.5	352.2	359.7	7.3	14.7	22.0	29.3	36.5	43.4	50.2	56.8	63.4	69.9	75.9	81.9	87.7
	Merc. ...	353.6	12.0	30.4	46.9	59.5	64.5	59.8	54.0	57.7	69.0	84.9	102.4	120.8	138.9	155.8	170.4	179.9	180.8
	Jup. ...	316.9	318.9	320.7	322.6	324.1	325.3	326.5	327.1	327.4	327.5	327.4	326.7	325.6	324.6	323.1	322.0	320.4	319.2
	Sat ...	270.5	270.6	270.8	270.8	270.4	270.0	269.6	268.8	268.0	267.3	266.6	265.9	265.1	264.7	264.2	263.7	263.7	263.8
1726	Mars	103.4	106.5	110.4	114.7	119.3	124.4	129.9	135.2	141.8	146.6	152.7	158.6	165.0	171.2	177.7	184.2	190.9	107.8
	Merc.	7.7	24.6	38.1	45.4	42.2	35.2	37.0	47.1	62.4	80.1	98.6	116.9	134.8	150.1	161.6	165.0	159.7	153.7
	Jup.	344.9	346.2	349.5	351.8	353.9	356.1	357.9	359.6	0.9	2.3	3.2	3.9	4.1	3.9	3.6	2.7	1.8	0.8
	Sat.	281.3	281.6	281.9	282.2	282.0	281.7	281.5	280.9	280.2	279.5	278.7	278.0	277.8	276.6	276.0	275.4	275.2	275.1
1727	Mars ...	345.4	353.2	309.8	7.3	15.9	23.3	30.7	37.8	45.0	51.9	58.8	65.5	72.2	78.7	85.3	91.5	97.7	103.8
	Merc.	16.6	25.1	23.9	16.8	16.3	25.5	40.3	57.6	76.2	94.9	112.9	129.3	142.2	147.9	144.5	137.5	137.4	148.6
	Jup. ...	12.4	14.8	17.2	19.6	21.9	23.3	26.6	28.8	30.8	32.8	34.5	36.3	37.7	38.7	39.6	39.9	40.4	40.0
	Sat.	292.2	292.8	293.2	293.7	293.6	293.6	293.6	293.2	292.6	292.2	291.4	290.6	289.6	288.9	288.3	287.7	287.4	287.1
1728	Mars	130.9	131.4	132.9	135.3	138.5	142.4	146.7	151.5	156.7	162.0	167.8	173.6	179.7	186.0	192.4	199.0	205.8	212.5
	Merc. ..	6.0	359.2	355.5	3.9	17.7	34.8	53.3	72.3	90.9	108.0	122.0	130.0	128.7	121.4	120.5	129.0	142.7	159.2
	Jup. ...	39.9	41.0	44.0	46.6	48.7	51.1	53.5	55.8	58.1	60.4	62.9	64.9	67.0	68.8	70.6	71.8	73.2	74.0
	Sat. ...	303.0	303.6	304.6	305.1	305.3	305.5	305.7	305.3	304.9	304.6	304.0	303.4	302.6	301.8	301.0	300.2	299.7	299.2
1729	Mars ...	1.0	8.8	16.2	23.5	30.8	37.9	45.1	52.2	59.1	66.0	73.7	79.3	85.9	92.4	98.9	105.2	111.4	117.7
	Merc.	337.6	342.8	355.8	12.2	30.4	49.4	68.3	86.2	101.0	110.9	112.2	105.2	102.1	108.5	121.6	138.0	155.5	173.2
	Jup	68.0	69.6	71.4	73.3	75.1	77.2	79.5	81.7	84.1	86.4	86.6	91.0	93.2	95.3	97.4	99.4	101.5	103.1
	Sat.	313.9	314.8	315.7	316.6	317.0	317.5	318.0	317.9	317.6	317.6	317.0	316.5	315.8	315.0	314.2	313.4	312.7	312.0
1730	Mars	173.2	170.0	167.8	166.3	166.4	167.7	170.2	173.4	177.2	181.6	186.6	191.9	197.7	203.6	209.8	215.9	222.8	229.7
	Merc.	334.1	349.6	7.6	25.9	44.9	63.7	78.9	91.1	91.2	88.4	83.5	88.8	100.9	116.7	134.0	152.1	169.8	185.9
	Jup. ...	97.6	98.3	99.2	100.5	101.8	103.7	105.3	107.4	109.4	111.5	113.5	115.6	118.2	120.4	122.7	124.9	126.9	129.8
	Sat	325.1	326.1	327.2	328.2	328.9	329.5	330.1	330.3	330.4	330.5	330.1	329.7	329.3	328.5	328.1	326.9	326.1	325.3
1731	Mars	16.2	23.4	30.6	37.7	44.7	51.8	58.6	65.4	72.3	78.9	85.7	92.2	98.6	105.1	111.7	117.9	124.2	130.3
	Merc ..	345.2	3.6	22.5	40.9	57.3	70.0	75.4	71.0	65.0	68.0	79.4	94.9	112.4	130.6	148.6	165.5	179.8	189.2
	Jup ...	129.2	128.9	128.9	128.9	129.6	130.4	131.4	132.8	134.4	136.1	138.1	140.1	142.2	144.1	146.2	148.7	150.7	152.9
	Sat. ...	336.4	337.5	338.6	339.8	340.7	341.5	342.4	342.8	343.2	343.6	343.4	343.2	343.0	342.3	341.7	341.1	340.3	339.5
1732	Mars ...	226.1	226.4	225.4	223.6	220.8	217.9	215.5	213.9	213.7	214.4	216.5	219.7	223.5	228.1	233.1	238.7	244.7	250.9
	Merc. ..	359.9	18.1	35.0	48.8	56.0	53.4	46.5	47.5	57.8	73.0	90.8	108.8	127.0	144.6	159.9	171.0	174.7	168.9
	Jup.	162.7	161.6	160.6	159.7	159.3	159.3	159.2	160.9	160.7	161.6	162.9	164.5	166.8	168.1	170.1	172.2	174.1	176.2
	Sat. ..	347.9	349.1	350.4	351.6	352.7	353.8	354.8	355.4	356.0	356.7	356.7	356.9	356.9	356.5	356.1	355.5	354.7	353.9
1733	Mars ...	30.9	38.0	44.7	51.5	58.3	65.1	71.8	78.3	84.7	91.4	97.9	104.4	110.8	117.3	123.6	129.9	136.2	142.6
	Merc. ...	12.6	27.4	37.6	35.4	28.2	27.1	36.4	50.6	68.5	86.3	105.0	123.0	139.8	152.1	157.6	154.8	147.3	148.8
	Jup.	196.8	194.5	194.3	192.9	191.7	190.5	189.8	189.4	189.4	189.6	189.9	190.8	191.0	192.9	195.6	196.2	198.1	200.1
	Sat. ...	359.6	0.9	2.2	3.5	4.7	5.9	7.0	7.8	8.7	9.6	9.9	10.3	10.7	10.5	10.2	10.0	9.4	8.6
1734	Mars ...	261.1	266.4	271.2	275.2	279.3	282.9	285.8	289.0	288.1	287.5	286.0	283.1	278.5	279.3	278.5	279.7	281.9	285.0
	Merc.	15.3	17.0	10.1	7.1	14.7	28.2	45.6	63.6	82.6	101.4	118.1	132.0	140.0	138.8	132.3	130.3	138.8	152.2
	Jup. ...	203.5	229.8	228.8	227.9	226.6	225.2	223.9	222.7	221.6	220.8	220.3	220.0	220.3	220.6	221.5	222.6	224.0	225.3
	Sat.	11.6	12.5	14.2	15.6	16.4	18.2	19.5	20.5	21.5	22.6	23.2	23.9	24.5	24.6	24.6	24.6	24.2	23.8
1735	Mars ...	45.7	52.1	58.7	65.1	71.6	78.0	84.5	90.8	97.3	103.7	110.1	116.8	122.7	129.1	135.5	148.8	148.2	154.6
	Merc ...	353.0	348.1	353.3	6.1	22.5	40.8	59.9	78.6	96.2	111.1	121.1	122.4	115.6	112.4	118.6	131.6	147.6	164.9
	Jup. ..	262.4	262.7	263.0	262.7	262.1	261.4	260.2	259.0	257.7	256.3	255.1	254.0	253.2	252.4	252.3	252.5	252.7	253.3
	Sat.	24.0	25.3	26.6	27.8	29.2	30.6	32.0	33.2	34.4	35.5	36.4	37.2	38.0	38.4	38.7	39.1	38.8	38.7
1736	Mars ...	284.9	291.7	298.4	305.3	312.0	318.6	325.0	331.2	337.1	342.9	347.9	352.4	356.2	359.2	1.0	1.4	0.6	358.4
	Merc. ..	332.3	344.2	0.0	17.9	36.8	55.8	74.0	89.9	101.4	104.9	99.1	94.1	98.8	110.9	126.4	143.8	161.5	179.1
	Jup. ...	292.1	293.8	294.9	295.9	296.7	296.8	297.0	296.8	295.8	295.0	293.7	292.3	290.9	289.7	288.6	287.6	286.9	286.4
	Sat.	36.4	37.7	39.0	40.4	41.7	43.0	44.4	45.7	47.0	48.2	49.3	50.4	51.5	52.1	52.6	53.2	53.3	53.2

Mesh.	Vrsh.	Mith.	Kat.	Sim.	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13.3	26.7	40.0	53.3	66.7	80.0	93.3	106.7	120.0

V-B—*cont*

Mars, A.D. 1637—A.D. 1999 ; Mercury, A.D. 1645—A.D. 1999 ; Jupiter, A.D. 1656—A.D. 1999, Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260	270		280	290	300	310	320	330	340	350	360
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
178·2	184·8	191·4	198·2	205·0	212·0	218·8	225·9	233·0	240·2	**1723**	247·5	254·8	262·1	269·5	277·2	284·6	292·2	299·8	307·6
184·7	201·5	216·0	226·5	229·0	222·4	217·4	221·8	233·1	249·3		265·6	283·7	300·7	317·0	330·8	337·6	335·6	328·1	328·2
223·6	225·5	227·5	229·6	231·8	234·0	236·5	238·5	240·8	243·0		245·4	247·3	249·5	251·3	253·1	254·5	256·0	257·0	257·8
232·5	233·4	234·4	235·4	236·5	237·7	238·8	240·0	241·1	242·3		243·3	244·3	245·4	246·1	246·9	247·7	248·0	248·2	248·6
																	Mr 3	Mr 13	Mr 23
70·6	74·3	77·2	79·1	80·2	79·8	78·2	75·8	71·8	68·2	**1724**	65·6	63·9	63·5	64·4	66·2	69·1	72·4	76·4	80·6
196·6	208·7	218·5	209·3	202·5	203·7	213·5	228·0	243·9	262·2		279·6	296·2	310·1	319·2	318·8	312·3	309·7	317·2	330·7
250·5	252·0	253·6	255·4	257·2	259·3	261·4	263·8	266·0	268·3		270·6	273·0	275·3	277·7	279·9	282·0	283·9	285·9	287·4
242·6	243·6	244·4	245·2	246·4	247·5	248·6	249·8	251·0	252·1		253·2	254·3	254·4	256·2	257·1	258·0	258·5	258·9	259·5
																	Mr 4	Mr 14	Mr 24
191·0	197·8	204·7	211·7	218·7	225·9	233·1	240·4	247·8	255·3	**1725**	262·8	270·3	278·0	285·8	293·5	301·4	309·2	317·1	324·9
197·2	195·4	187·9	186·7	194·9	208·1	224·2	241·5	259·0	275·6		290·2	300·7	302·5	295·8	291·6	297·2	309·3	325·7	343·5
281·6	281·9	282·7	283·9	285·1	286·6	288·4	290·5	292·6	294·8		296·9	299·4	301·7	303·9	306·5	308·9	311·2	313·5	315·7
253·1	253·8	254·5	255·3	256·3	257·3	258·3	259·5	260·7	261·9		263·1	264·3	265·4	266·3	267·3	268·3	268·9	269·6	270·2
93·2	98·3	103·0	107·5	111·0	114·1	116·6	117·7	118·2	117·2	**1726**	114·9	111·7	107·8	104·1	101·2	99·4	99·1	100·0	102·1
178·7	170·0	176·3	188·3	203·9	220·9	238·3	255·8	270·4	282·0		285·7	280·9	274·9	278·0	288·7	304·0	321·4	339·9	358·3
318·2	317·5	317·1	316·7	317·3	317·8	318·5	319·8	321·3	323·1		325·0	326·9	329·1	331·3	333·6	336·1	338·5	340·9	343·3
263·8	264·4	265·0	265·5	266·5	267·3	268·3	269·5	270·7	271·8		273·8	274·2	275·3	276·4	277·5	278·6	279·4	280·3	281·1
205·1	211·5	218·6	225·6	233·0	240·4	247·8	255·2	263·0	270·8	**1727**	279·4	286·5	294·1	302·0	309·9	317·7	325·7	333·5	341·3
157·5	168·7	183·6	200·4	217·8	234·8	250·6	263·1	270·3	267·0		259·7	259·7	268·5	282·8	299·7	317·8	336·1	353·8	9·5
359·8	357·9	356·6	355·2	354·3	353·8	353·4	353·5	353·8	354·6		355·7	356·8	358·3	0·1	2·3	4·2	6·5	8·7	11·1
275·0	275·3	275·8	276·1	276·9	277·8	278·6	279·7	280·8	281·9		283·1	284·3	285·4	286·6	287·9	289·0	289·9	290·8	291·8
																	Mr 3	Mr 13	Mr 23
109·5	115·5	120·8	126·0	131·0	135·7	139·9	143·5	146·7	148·8	**1728**	150·2	150·2	149·0	146·5	142·8	139·3	135·7	132·7	131·4
163·3	179·9	197·3	214·4	230·7	244·5	252·8	252·5	244·9	242·5		249·3	262·4	278·5	296·2	314·3	332·0	348·2	1·0	6·8
39·6	38·7	37·5	33·4	34·8	33·5	32·2	31·2	30·2	29·7		29·6	29·7	30·2	31·1	32·1	33·3	35·0	36·7	38·8
286·5	286·7	286·8	287·0	287·7	288·4	289·0	290·1	291·0	292·1		293·3	294·5	295·6	296·8	298·0	299·3	300·4	301·5	302·5
																	Mr 4	Mr 14	Mr 24
219·5	226·6	233·8	241·1	248·5	256·1	263·7	271·4	279·7	286·9	**1729**	294·8	302·7	310·6	318·3	326·2	334·1	341·8	349·4	357·2
176·6	194·0	210·8	225·2	235·5	237·6	231·6	226·4	230·6	242·4		257·8	275·0	292·8	310·4	327·0	340·3	348·0	346·1	339·0
74·2	75·0	75·2	74·7	74·0	73·1	71·8	70·0	69·2	67·9		67·5	65·5	64·9	64·6	64·4	64·8	65·2	66·2	67·2
298·7	298·6	298·5	298·5	299·0	299·4	299·9	300·8	301·7	302·6		303·8	305·0	306·1	307·3	308·5	309·8	311·0	312·2	313·4
123·7	129·6	135·4	142·1	146·7	152·2	157·5	162·2	167·1	171·5	**1730**	175·3	178·8	181·5	183·2	184·2	183·7	181·8	178·6	174·9
190·5	205·8	217·9	223·4	218·2	210·8	212·9	222·9	237·4	253·9		271·6	289·3	305·9	320·1	328·9	329·2	321·9	319·7	327·0
104·6	105·8	106·7	107·6	107·9	108·2	107·9	107·2	106·5	105·3		104·0	102·7	101·3	100·0	98·9	98·0	97·7	97·2	97·5
311·3	311·1	310·9	310·5	310·8	311·0	311·4	312·2	312·9	313·6		314·7	315·8	317·0	318·2	319·4	320·7	321·9	323·1	324·4
236·7	243·7	251·0	258·2	266·7	273·2	280·8	288·6	296·3	304·0	**1731**	311·8	319·5	327·1	334·8	342·6	350·0	357·5	5·0	12·3
199·2	206·2	204·8	197·1	195·7	204·0	217·3	233·5	250·7	268·2		285·0	299·8	310·2	312·3	306·1	301·4	307·2	319·4	335·7
131·0	132·7	134·4	135·8	137·3	138·2	138·9	139·5	139·5	139·3		138·9	137·9	136·8	135·5	134·2	132·8	131·6	130·5	130·7
324·6	324·2	323·7	323·2	323·3	323·4	323·4	323·9	324·5	325·2		326·2	327·2	328·2	329·5	330·6	331·9	333·2	334·5	335·8
																	Mr 3	Mr 13	Mr 23
136·5	142·6	148·7	154·7	160·7	166·5	172·4	178·1	183·8	189·4	**1732**	194·7	199·7	204·8	209·6	213·7	217·7	221·2	223·7	225·6
190·0	183·0	179·4	185·4	197·6	213·0	230·0	247·4	264·5	279·7		291·3	295·7	290·8	284·7	287·5	298·6	313·9	331·4	350·0
155·2	157·8	159·4	161·4	163·1	164·8	166·2	167·6	168·5	169·2		169·6	169·9	169·9	169·2	168·3	167·1	166·0	164·7	163·4
338·6	337·9	337·3	336·7	336·4	336·2	336·1	336·4	336·8	337·2		338·1	339·0	339·8	340·9	342·1	343·3	344·6	345·9	347·1
																	Mr 4	Mr 14	Mr 24
257·5	264·1	271·1	278·1	285·3	292·7	300·2	307·5	314·8	322·2	**1733**	339·6	337·0	344·6	351·7	359·0	6·1	13·1	20·3	27·2
163·2	167·0	177·9	192·9	209·6	226·9	244·1	259·8	272·5	299·0		276·2	269·1	268·9	278·5	292·9	309·5	327·8	345·9	4·1
178·4	180·9	182·8	185·2	187·3	189·4	191·3	193·0	194·8	196·4		197·3	198·6	199·2	199·9	199·8	199·7	199·4	198·4	197·4
353·1	352·3	351·5	350·7	350·3	349·8	349·5	349·6	349·8	349·9		350·5	351·2	351·8	352·9	354·0	355·1	356·3	357·6	358·9
148·8	155·2	161·3	167·7	173·8	180·2	186·4	192·5	198·6	204·9	**1734**	211·1	217·3	223·4	229·4	235·4	241·4	247·0	252·8	258·3
158·2	172·6	189·1	206·5	223·8	240·2	253·6	262·0	261·6	254·4		251·5	258·5	271·9	288·1	306·0	324·1	342·0	358·3	11·6
202·2	204·4	206·3	208·5	210·7	213·2	215·1	217·3	219·6	221·5		223·3	225·1	226·6	227·2	229·4	229·9	230·5	230·7	230·8
7·9	7·1	6·3	5·4	4·9	4·2	3·6	3·5	3·3	3·2		3·6	4·1	4·5	5·4	6·3	7·1	8·3	9·6	10·8
283·2	293·8	293·1	304·6	310·5	316·6	322·9	329·5	335·9	342·4	**1735**	349·1	355·8	2·4	9·1	15·7	22·3	29·0	35·5	42·1
168·5	184·8	203·3	220·0	234·6	244·7	246·7	240·3	235·4	240·3		251·7	267·5	284·3	302·4	320·8	336·7	350·5	358·3	356·7
227·1	229·0	231·0	233·1	235·4	237·5	239·9	242·1	244·4	246·5		248·8	250·9	252·9	254·9	256·9	258·5	259·9	261·0	263·0
23·2	22·4	22·9	20·8	20·0	19·3	18·5	17·9	17·5	17·2		17·3	17·5	17·7	18·4	19·2	19·9	21·0	22·1	23·2
																	Mr 3	Mr 13	Mr 23
161·0	167·4	174·1	180·3	186·9	193·4	200·0	206·5	213·2	219·7	**1736**	226·5	233·3	240·0	246·8	253·5	260·4	267·4	274·3	281·2
182·7	199·7	214·9	226·6	231·4	227·0	220·3	222·0	232·2	246·7		263·5	281·2	298·9	315·6	329·8	339·0	339·4	332·4	330·1
254·4	255·7	257·4	259·1	261·1	263·1	265·0	267·3	269·5	271·9		274·1	276·4	27[illegible]·8	281·1	283·6	285·7	287·7	289·6	291·6
38·3	37·7	37·0	36·2	35·4	34·6	33·7	33·1	32·5	31·9		31·7	31·6	31·5	32·1	32·4	32·9	33·9	34·8	35·8
																	Mr 4	Mr 14	Mr 24
356·6	353·5	351·9	351·5	352·3	354·0	356·5	359·8	3·6	7·9	**1737**	12·5	17·5	22·9	28·3	33·7	39·5	45·5	51·3	57·1
195·2	208·3	215·4	213·4	205·9	201·5	213·0	226·6	242·7	260·0		277·5	294·4	300·5	319·9	322·5	316·3	311·7	316·7	329·4
286·2	286·6	287·1	288·0	289·4	290·6	292·4	294·2	296·3	298·5		300·7	302·9	305·2	307·8	310·2	312·3	315·7	317·2	319·6
53·3	52·8	52·3	51·8	51·0	50·2	49·3	48·6	47·8	47·0		46·7	46·4	45·9	46·1	46·3	46·6	47·3	48·0	48·7

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Śrav.	Dan.	Satab.	P. Bhad	U. Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle. Venus, A.D. 1765—A.D. 1999;

Day of I.S.Y		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ..	Mr 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16	Au 26	S 5	S 15
1737	Mars ...	60·4	66·5	72·5	78·6	84·7	90·8	97·1	103·3	109·4	115·8	121·9	128·3	134·6	141·0	147·4	153·7	160·3	166·7
	Merc.	337·8	355·3	13·8	32·8	51·3	67·9	80·6	86·4	82·1	75·8	78·7	89·7	104·6	122·2	140·3	158·3	174·8	189·3
	Jup. ...	320·7	322·7	324·7	326·8	328·3	329·7	331·0	331·8	332·2	332·4	332·4	332·0	331·2	330·3	329·0	327·5	326·2	324·7
	Sat. ...	49·3	50·7	51·9	53·0	54·3	55·6	56·8	58·3	59·7	61·0	62·2	63·4	64·7	65·4	66·3	67·1	67·5	68·1
1738	Mars ..	304·4	311·8	319·4	326·8	334·4	341·8	349·2	356·3	3·3	10·3	16·8	23·3	29·5	35·4	41·1	46·1	50·7	54·8
	Merc. ..	351·3	10·2	28·5	45·6	59·6	66·7	64·7	57·6	58·5	69·2	83·1	100·3	118·5	137·0	154·0	169·4	180·7	183·8
	Jup. ..	348·6	351·0	353·3	355·6	357·7	359·9	2·1	3·8	5·3	6·8	7·8	8·6	8·8	9·1	8·7	8·3	7·3	6·2
	Sat. ..	62·5	63·5	64·7	65·7	67·0	68·3	69·5	70·9	72·2	73·5	74·8	76·1	77·4	78·5	79·5	80·5	81·1	81·7
1739	Mars ..	76·3	81·6	87·0	92·7	98·5	104·1	110·0	116·0	121·9	128·1	134·2	140·5	146·8	153·2	159·5	166·1	172·5	179·1
	Merc ..	6·0	23·2	37·8	46·7	46·5	39·4	38·3	46·6	61·0	78·1	96·6	114·9	132·9	148·9	161·7	167·4	164·0	157·0
	Jup ...	15·9	18·4	20·8	23·2	25·5	27·9	30·2	32·6	34·8	36·6	38·7	40·3	41·8	43·1	44·0	44·8	45·1	45·1
	Sat. ..	75·9	76·8	77·6	78·5	79·6	80·9	82·1	83·3	84·7	85·9	87·3	88·7	90·1	91·2	92·3	93·5	94·4	95·2
1740	Mars	322·2	330·0	337·8	345·6	353·0	0·6	8·1	15·4	22·6	29·7	36·7	43·4	50·2	56·7	62·8	68·9	74·8	80·3
	Merc. ..	16·0	26·6	28·1	21·2	18·2	25·1	38·9	55·6	73·9	92·6	110·9	127·8	142·0	149·6	148·8	141·2	140·1	147·9
	Jup. ...	43·8	46·0	48·1	50·2	52·3	54·9	57·2	59·5	61·9	64·2	66·5	68·7	70·7	72·4	74·1	75·8	77·2	78·2
	Sat ...	89·5	90·1	90·7	91·3	92·4	93·4	94·5	95·3	96·9	98·2	99·6	100·9	102·3	103·5	104·7	106·0	107·0	108·1
1741	Mars ...	95·0	98·8	103·2	108·0	113·2	118·3	124·0	129·4	135·3	141·2	147·1	153·4	159·6	165·9	172·3	178·8	185·7	192·3
	Merc. .	9·6	4·2	359·0	4·1	16·6	32·9	51·1	70·0	89·0	105·9	121·4	131·6	132·5	125·2	122·3	128·8	141·3	157·1
	Jup. ..	72·1	73·4	75·2	76·9	78·9	81·0	83·0	85·2	87·6	89·9	92·1	94·5	96·7	99·0	101·0	103·2	105·0	106·8
	Sat .	103·3	103·6	103·9	104·3	105·1	106·0	106·8	107·9	109·0	110·5	111·5	112·8	114·1	115·4	116·7	118·0	119·1	120·2
1742	Mars ..	339·1	346·[illegible]	354·6	2·3	9·9	17·3	24·6	31·9	39·1	46·2	52·9	59·7	66·5	73·0	79·4	85·6	91·9	97·9
	Merc. .	340·8	343·0	354·8	10·3	28·2	47·1	66·1	84·2	100·0	111·8	115·4	109·7	104·4	108·4	120·8	136·1	153·3	171·0
	Jup. ...	101·9	102·5	103·2	104·2	105·6	106·9	108·8	110·8	112·7	114·8	117·0	119·0	121·2	123·6	125·6	127·9	130·2	132·1
	Sat ...	117·2	117·2	117·2	117·3	118·0	118·7	119·2	120·2	121·2	122·2	123·5	124·8	126·0	127·3	128·6	129·9	131·1	132·3
1743	Mars ...	119·1	120·7	123·3	126·5	130·3	134·7	139·6	144·7	150·1	155·7	161·6	167·4	172·8	179·9	186·5	193·0	199·8	206·7
	Merc.	333·3	348·1	5·5	24·4	43·4	61·8	78·3	91·3	97·0	98·2	86·7	88·9	99·9	114·9	132·1	150·0	167·7	184·3
	Jup. ...	133·8	133·3	133·1	133·2	133·5	134·3	135·4	136·5	138·0	139·6	141·4	143·4	145·4	147·5	149·6	151·8	154·0	156·2
	Sat. ...	131·1	130·8	130·5	130·4	130·8	131·1	131·6	132·4	133·2	134·0	135·2	136·3	137·5	138·8	140·0	141·3	142·5	143·8
1744	Mars	355·2	2·6	10·3	17·7	25·4	32·4	39·7	46·7	53·7	60·5	67·5	74·2	80·8	87·3	93·7	100·0	106·2	112·4
	Merc. ...	343·1	1·5	20·3	38·9	56·1	70·1	77·5	75·9	68·7	69·0	78·7	93·3	110·3	126·8	146·6	163·7	173·9	189·9
	Jup. ...	167·4	166·1	165·1	164·2	163·5	163·4	163·3	163·5	164·5	165·4	166·6	168·1	169·7	171·5	173·4	175·5	177·5	179·7
	Sat. .	144·8	144·3	143·8	143·5	143·6	143·8	143·8	144·4	145·1	145·7	146·7	147·7	148·8	150·0	151·2	152·4	153·7	154·0
1745	Mars	154·0	152·2	151·6	152·1	153·8	156·4	159·8	163·9	168·3	173·3	178·6	184·2	190·0	196·3	202·5	209·1	215·9	227·7
	Merc. ..	357·7	15·6	33·5	48·4	57·6	58·0	50·9	48·9	57·4	71·6	88·4	106·5	124·9	142·6	158·6	171·3	177·1	173·4
	Jup.	201·4	200·2	199·4	197·5	196·4	195·4	194·3	193·8	193·6	193·6	193·9	194·6	195·5	196·7	198·3	199·8	201·5	203·5
	Sat. .	158·2	157·6	157·0	156·4	156·2	156·2	156·1	156·4	156·8	157·2	158·1	159·0	159·8	160·9	162·0	163·1	164·3	165·6
1746	Mars ...	10·4	17·8	25·1	32·3	39·5	46·6	53·5	60·4	67·3	73·9	80·6	87·3	93·9	100·3	106·6	113·0	119·3	125·5
	Merc ...	11·3	26·9	37·5	39·2	32·6	29·4	36·0	49·4	66·0	84·0	102·7	121·0	137·8	151·8	159·2	158·7	151·1	149·9
	Jup. .	235·0	234·0	233·4	232·7	231·4	230·1	228·7	227·6	226·3	225·5	224·8	224·4	224·4	224·8	225·5	226·4	227·6	229·0
	Sat ...	171·4	170·7	170·0	169·3	169·0	168·6	168·2	168·4	168·6	168·7	169·4	170·1	170·8	171·8	172·9	173·9	175·1	176·3
1747	Mars ...	206·7	204·4	201·3	198·2	195·1	193·4	193·0	194·0	195·9	198·9	202·5	206·8	211·8	217·0	222·9	228·9	235·3	242·0
	Merc. ...	16·4	20·7	15·0	9·9	14·4	27·1	43·3	61·5	80·5	98·9	116·3	131·3	141·5	142·8	136·0	132·1	138·1	150·9
	Jup	266·4	267·2	267·4	267·3	267·0	266·4	265·4	264·2	262·9	261·6	260·3	259·1	258·1	257·3	257·0	256·8	257·0	257·7
	Sat. .	184·3	183·5	182·7	181·9	181·4	180·9	180·3	180·3	180·3	180·2	180·6	181·1	181·6	182·5	183·4	184·3	185·4	186·6
1748	Mars	25·3	32·3	39·2	46·3	53·0	59·9	66·7	73·3	80·0	86·6	93·3	99·6	106·1	112·6	118·9	125·4	131·7	137·8
	Merc. ..	357·7	351·2	353·8	5·2	20·7	38·6	57·3	76·0	93·9	110·2	121·6	125·5	120·2	114·7	118·7	130·4	145·7	162·8
	Jup. .	296·1	297·8	299·1	300·3	301·3	301·6	301·8	301·4	300·9	300·2	299·2	297·9	296·6	295·2	294·0	292·9	292·0	291·3
	Sat ...	196·7	195·9	195·1	194·4	193·7	193·1	192·4	192·2	192·0	191·6	191·9	192·2	192·5	193·2	194·0	194·7	195·8	196·8
1749	Mars ...	249·4	253·2	256·6	259·1	260·8	261·3	260·9	259·0	257·0	254·8	252·1	250·5	251·5	253·1	255·9	259·4	264·0	269·0
	Merc. ..	334·2	343·3	358·2	16·0	34·7	53·7	72·2	88·8	101·7	107·6	103·7	97·4	99·0	109·9	124·6	141·7	159·5	177·1
	Jup. .	324·4	326·6	328·8	330·6	332·4	334·0	335·2	336·3	337·0	337·4	337·7	337·2	336·7	335·7	334·5	333·2	331·8	330·4
	Sat. .	208·9	208·1	207·4	206·6	205·9	205·0	204·4	204·0	203·6	203·2	203·2	203·2	203·3	203·9	204·5	205·0	205·9	206·8
1750	Mars ...	39·9	46·5	53·1	59·7	66·5	73·0	79·5	86·1	92·5	98·9	105·3	111·7	118·2	124·5	130·9	137·3	143·6	152·0
	Merc. ..	336·5	353·4	11·7	30·6	49·3	63·4	80·5	88·6	86·8	79·6	79·6	88·9	102·7	120·2	138·2	155·0	172·8	188·8
	Jup. ..	352·1	354·5	356·9	359·3	1·5	3·8	5·7	7·7	9·4	10·9	12·2	13·1	13·7	14·1	13·9	13·6	13·0	11·9
	Sat. ...	220·7	220·0	219·3	218·7	217·9	217·1	216·3	215·7	215·1	214·6	214·4	214·4	214·3	214·6	214·9	215·4	216·2	217·1
	Eng. date ..	Mr 30	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16
1751	Mars ...	276·4	282·7	289·0	295·3	301·3	307·1	312·5	317·7	322·4	326·5	330·0	332·2	333·3	332·7	331·1	328·7	326·3	324·7
	Merc .	349·1	7·9	26·5	43·9	59·0	68·7	69·2	62·1	60·0	67·8	81·6	98·3	116·3	134·6	152·2	167·7	180·7	186·4
	Jup. ...	19·9	22·3	24·7	27·1	29·5	31·9	34·2	36·6	38·7	40·8	42·7	44·4	46·2	47·4	48·5	49·4	49·8	49·9
	Sat. ...	232·2	231·7	231·3	230·5	229·7	228·9	228·2	227·5	226·8	225·9	225·8	225·4	225·2	225·4	225·6	225·8	226·5	227·1

Mesh.	Vrsh.	Mith	Kat.	Sim.	Kan	Tul	Vrsch.	Dhan.	Mak.	Kum.	:Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push	Asles
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999.

180	190	200	210	220	230	240	250	260	270		280	290	300	310	320	330	340	350	360
S 25	O 5	O 15	O 25	N 4	N 14	N 24	D 4	D 14	D 24		Ja 3	Ja 13	Ja 23	F 2	F 12	F 22	Mr 4	Mr 14	Mr 24
173·1	179·8	186·5	193·2	199·9	206·7	213·5	220·4	227·4	234·4	**1738**	241·5	248·7	256·0	263·3	270·5	278·1	285·5	292·9	300·5
193·5	199·2	192·0	188·4	194·6	206·7	222·1	239·4	256·8	273·9		289·2	300·8	305·5	300·3	294·2	297·4	308·3	323·8	341·4
323·7	322·8	322·3	321·8	321·9	322·3	323·2	324·2	325·6	327·2		328·8	330·8	332·9	335·1	337·5	339·8	342·2	344·7	347·1
68·1	67·9	67·6	67·4	66·7	66·7	65·3	64·4	63·6	62·7		62·1	61·5	60·8	60·7	60·6	60·5	61·0	61·5	62·0
57·9	60·2	61·4	61·4	60·1	57·4	54·6	51·4	48·8	47·3	**1739**	46·8	47·8	49·7	52·4	55·8	59·6	63·9	68·7	73·6
178·2	172·5	176·2	187·2	202·1	219·0	236·2	253·3	269·1	281·9		288·5	285·6	278·5	278·8	287·8	302·2	319·4	337·7	356·3
5·0	3·6	2·3	0·7	359·7	359·1	358·4	358·4	358·5	359·1		359·9	1·1	2·6	4·4	6·1	8·1	10·2	12·6	14·9
82·3	82·3	82·3	82·3	81·8	81·3	80·8	79·9	79·1	78·3		77·5	76·8	76·0	75·7	75·3	74·9	75·1	75·4	75·5
																	Mr 3	Mr 13	Mr 23
185·7	192·5	199·4	206·2	213·3	220·4	227·4	234·7	242·0	249·4	**1740**	256·6	264·2	271·8	279·4	287·1	294·8	302·6	310·5	318·2
158·0	167·6	182·1	198·4	215·7	232·9	249·1	262·8	271·2	270·6		263·4	261·1	268·0	281·4	297·7	315·8	334·1	352·2	8·5
44·7	44·1	43·1	41·9	40·5	38·7	37·9	36·5	35·7	34·9		34·6	34·5	34·8	35·6	36·6	37·6	39·1	40·8	42·5
96·0	96·3	96·5	96·8	96·6	96·3	96·1	95·3	94·5	93·8		93·1	92·2	91·3	90·8	90·2	89·5	89·5	89·4	89·3
																	Mr 4	Mr 14	Mr 24
85·4	90·4	94·5	98·1	101·2	103·4	104·5	104·4	103·2	100·4	**1741**	96·7	93·0	89·7	87·0	86·1	86·2	87·6	90·0	93·0
161·7	177·9	195·2	212·5	229·0	243·5	253·7	255·7	249·8	244·7		249·2	261·1	276·6	294·0	312·2	330·0	346·9	0·8	9·0
79·1	79·4	79·7	79·4	79·0	78·1	77·0	75·7	74·5	73·2		71·9	70·9	70·0	69·4	69·4	69·3	69·7	70·5	71·3
109·0	109·5	110·1	110·6	110·7	110·6	110·6	110·1	109·5	108·9		108·1	107·3	106·5	105·8	105·0	104·2	103·9	103·6	103·2
199·1	206·0	213·0	220·3	227·4	234·6	242·0	249·4	257·0	264·5	**1742**	272·3	280·0	287·7	295·6	303·4	311·4	319·3	327·1	335·1
173·9	191·5	209·0	224·1	235·9	240·1	236·3	229·4	231·1	241·4		255·9	272·6	290·5	308·3	325·4	339·8	349·5	350·2	343·4
108·3	109·8	110·8	111·7	112·2	112·5	112·3	111·9	111·2	110·2		109·1	107·7	106·4	105·3	104·0	103·0	102·4	102·1	102·0
121·4	122·2	122·9	123·7	124·0	124·2	124·5	124·2	123·9	123·6		122·9	122·2	121·4	120·6	119·9	119·1	118·5	117·9	117·3
103·6	109·2	114·4	119·3	124·0	128·1	131·8	134·6	136·8	137·9	**1743**	138·0	136·7	133·7	130·3	126·3	122·9	120·3	118·7	118·5
188·6	204·5	217·5	224·3	222·7	214·8	213·8	221·4	235·8	251·9		269·3	287·1	304·2	319·3	329·9	332·8	326·5	321·8	326·6
134·1	136·0	137·9	139·3	140·7	142·0	142·8	143·3	143·6	143·5		143·1	142·5	141·5	140·4	139·0	137·9	136·4	135·3	134·4
133·4	134·4	135·3	136·3	136·8	137·4	137·8	137·7	137·7	137·5		137·0	136·3	135·8	135·0	134·2	133·4	132·7	132·0	131·3
																	Mr 3	Mr 13	Mr 23
213·6	220·5	227·6	234·9	242·4	249·8	257·4	265·0	272·6	280·5	**1744**	288·2	296·2	304·1	311·9	319·8	327·7	335·6	343·3	351·0
193·6	207·6	208·3	200·7	197·5	203·8	216·0	231·6	248·6	266·1		283·2	298·7	310·6	315·3	310·7	304·4	307·1	318·6	333·9
158·4	160·6	162·6	164·6	166·5	168·1	169·6	171·1	172·1	173·1		173·6	173·9	173·8	173·3	172·8	171·7	170·6	169·3	168·1
145·1	146·1	147·2	148·2	149·2	149·6	150·4	150·5	150·6	150·8		150·4	150·0	149·7	149·0	148·2	147·5	146·7	145·9	145·1
																	Mr 4	Mr 14	Mr 24
118·4	124·3	130·0	135·6	141·0	146·1	151·0	155·6	159·7	163·4	**1745**	166·6	168·8	170·2	170·2	168·9	166·5	163·0	159·1	155·3
193·2	187·5	181·8	185·2	196·6	211·4	227·7	245·4	262·6	278·5		291·8	297·9	295·3	288·0	288·2	297·8	311·9	329·4	347·8
181·9	184·1	186·2	188·4	190·6	192·7	194·6	196·6	198·3	199·9		201·4	202·3	203·2	203·8	204·1	204·0	203·7	203·1	202·1
156·2	157·3	159·0	159·5	160·4	161·2	162·1	162·5	162·9	163·2		163·1	163·0	162·8	162·2	161·6	161·0	160·2	159·4	158·5
229·6	236·7	243·9	251·4	258·8	266·5	274·1	281·6	289·5	297·3	**1746**	305·1	312·9	320·7	328·5	336·1	343·9	351·4	359·1	6·5
166·5	167·2	177·1	191·1	207·5	224·9	242·0	258·4	272·0	280·4		280·3	272·7	270·4	277·9	291·2	307·5	325·6	344·1	2·2
205·6	207·6	209·7	212·0	214·2	216·4	218·6	220·8	222·9	225·0		227·0	228·7	230·3	231·8	233·1	234·0	234·8	235·1	235·1
166·8	168·0	169·3	170·4	171·4	172·4	173·4	174·0	174·5	175·1		175·2	175·3	175·4	175·0	174·5	174·1	173·3	172·7	171·8
131·7	137·8	143·7	149·7	155·4	161·2	166·7	171·1	177·6	182·8	**1747**	187·7	192·3	196·5	200·3	203·4	206·1	207·6	208·4	207·7
157·6	171·1	187·2	204·4	221·8	238·1	252·8	263·0	264·8	258·4		253·8	258·7	270·6	286·1	303·5	321·9	339·9	357·0	11·3
230·6	232·4	234·4	236·5	238·5	240·9	243·1	245·3	247·7	249·9		252·1	254·3	256·3	258·3	260·2	262·1	263·7	265·0	266·0
177·4	178·6	179·8	181·1	182·1	183·2	184·3	185·0	185·7	186·6		186·7	187·1	187·3	187·1	186·8	186·6	186·0	185·3	184·7
																	Mr 3	Mr 13	Mr 23
248·6	255·6	262·8	270·0	277·4	284·7	292·3	299·9	307·5	315·0	**1748**	322·5	330·1	337·6	345·1	352·5	359·7	7·2	14·4	21·6
166·6	183·7	201·3	218·1	233·1	244·8	249·3	244·8	238·2	240·2		250·8	266·1	282·3	300·2	318·1	335·2	350·2	0·1	1·0
258·6	259·8	261·4	263·0	264·7	266·7	268·8	270·9	273·0	275·5		277·8	280·2	282·5	284·9	287·1	289·3	291·4	293·4	295·4
187·8	189·0	190·2	191·4	192·5	193·6	194·7	195·5	196·4	197·3		197·8	198·3	198·8	198·8	198·7	198·7	198·1	197·5	197·0
																	Mr 4	Mr 14	Mr 24
144·2	150·4	156·6	162·7	168·8	174·9	181·0	187·1	193·1	199·1	**1749**	204·9	210·7	216·4	222·1	227·5	232·9	237·9	243·7	247·2
179·9	197·8	213·6	226·5	233·5	231·5	224·0	222·8	231·1	245·1		261·3	279·1	296·7	313·9	329·0	339·9	343·2	337·1	332·4
291·1	291·2	291·7	292·5	293·7	294·8	296·4	298·1	301·0	302·3		304·4	306·3	309·1	311·4	314·0	316·3	318·7	321·1	323·4
197·9	199·1	200·3	201·4	202·6	203·8	204·9	205·9	206·9	207·8		208·5	209·1	209·8	210·0	210·2	210·3	209·9	209·6	209·1
274·4	280·4	286·5	293·2	299·8	306·6	313·3	320·1	327·3	334·1	**1750**	341·2	348·3	355·2	2·2	9·1	15·8	22·7	29·5	36·4
198·8	207·8	216·9	217·0	209·9	206·1	212·7	225·2	240·7	258·0		275·5	292·8	308·4	320·4	325·5	320·8	314·8	317·1	328·4
329·3	328·4	327·5	327·2	326·9	327·3	327·9	328·7	330·0	331·4		333·3	334·9	337·0	339·2	341·4	343·8	346·2	348·6	350·8
207·3	209·0	210·1	211·3	212·5	213·7	214·8	215·9	217·0	218·0		218·8	219·6	220·3	220·7	221·1	221·4	221·4	221·4	220·9
156·3	162·8	169·1	175·4	181·9	188·3	194·6	201·1	207·6	214·1	**1751**	220·6	227·1	233·6	240·2	246·7	253·3	259·8	266·3	272·6
199·1	202·2	196·3	191·0	194·5	205·5	220·2	237·2	254·6	271·9		287·9	300·9	307·6	305·0	297·8	298·2	307·6	322·2	339·4
10·3	9·4	8·0	6·8	5·6	4·7	4·0	3·5	3·5	4·0		4·5	5·6	6·8	8·3	10·1	11·9	14·1	16·3	18·4
217·9	219·0	220·0	221·0	222·3	223·6	224·8	225·9	227·0	228·1		228·9	229·8	230·7	231·2	231·7	232·2	232·2	232·2	232·2
S 26	O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25	**1752**	Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 4	Mr 14	Mr 24
323·9	324·5	326·3	328·9	332·5	336·6	346·6	346·2	356·3	356·9		2·6	8·5	14·3	20·4	26·4	32·6	38·7	45·0	51·2
184·7	175·7	176·5	186·3	200·3	216·8	234·0	251·4	268·2	281·3		290·0	289·6	282·5	279·6	287·4	300·8	317·3	335·5	354·0
49·8	49·2	48·3	47·3	46·1	44·8	43·3	42·2	41·1	40·1		39·7	39·3	39·6	40·0	40·9	42·6	43·3	44·7	46·5
227·8	228·8	229·8	230·8	232·0	233·2	234·3	235·4	236·6	237·7		238·7	239·7	240·8	241·4	242·1	242·8	243·0	243·3	243·4

Mag.	P. Phal.	U. Phal.	Hasta.	Chit	Svati.	Visa.	Anur.	Jyesh.	Mu'la.	P. Ash.	U. Ash.	Śrav.	Dan	Satab.	P Bhad	U. Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle Venus, A.D. 1765—A.D. 1999;

Day of I S.Y.		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ...	Mar 29	Ap 8	Ap 18	Ap 28	My 8	My 18	My 28	Je 7	Je 17	Je 27	Jl 7	Jl 17	Jl 27	Au 6	Au 16*	Au 26	S 16*	S 26
1752	Mars ...	54·7	60·8	67·1	73·3	79·4	85·9	92·2	98·8	104·7	110·9	117·4	123·6	129·8	136·3	142·6	149·0	155·4	161·8
	Merc. ...	3·9	21·7	37·3	48·1	50·7	44·1	40·3	46·4	59·7	76·1	94·2	112·8	130·8	147·5	161·5	169·3	168·3	161·1
	Jup	47·5	49·5	51·6	53·8	55·9	58·4	60·9	63·2	65·4	67·9	70·2	72·2	74·4	76·8	78·0	79·7	81·8	82·4
	Sat ...	243·5	243·2	242·8	242·4	241·7	241·0	240·2	239·4	238·7	237·9	237·4	236·9	236·5	236·4	236·4	236·4	237·0	237·5
	Eng date ..	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1753	Mars ...	296·9	304·3	311·8	319·1	326·2	333·2	340·7	347·5	354·4	1·0	7·3	13·4	18·9	24·4	29·2	33·2	36·6	38·9
	Merc. ...	15·0	27·2	31·4	25·6	20·9	25·4	37·5	53·6	71·7	90·5	108·9	126·8	141·4	150·9	152·4	145·3	141·8	148·0
	Jup. ...	76·1	77·4	78·9	80·6	82·5	84·5	86·6	88·8	91·1	93·4	95·6	97·9	100·3	102·3	104·6	106·7	108·7	110·4
	Sat. ...	254·5	254·3	254·1	253·9	253·2	252·6	252·0	251·3	250·5	249·7	249·1	248·4	247·8	247·6	247·5	247·3	247·6	248·0
1754	Mars ...	69·8	75·5	81·2	87·1	92·9	98·9	104·9	101·0	117·1	123·1	129·4	135·7	143·0	148·3	154·7	161·2	167·6	174·3
	Merc. ...	12·3	9·0	2·8	4·6	15·7	31·1	49·2	67·8	86·9	104·0	120·4	132·3	135·7	139·4	124·8	128·7	140·2	155·2
	Jup. ...	106·2	106·6	107·1	108·1	109·3	110·7	112·3	114·1	116·0	118·0	120·3	122·4	124·6	126·7	129·0	131·2	133·3	135·5
	Sat. ...	265·5	265·5	265·5	265·5	265·0	264·5	263·9	263·1	262·3	261·6	260·9	260·2	259·5	259·2	258·8	258·4	258·6	258·7
	Eng. date ...	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1755	Mars ..	315·4	323·0	330·9	338·4	346·1	353·6	1·1	9·3	15·6	22·7	29·5	36·5	42·9	49·2	55·2	61·2	66·7	71·7
	Merc. .	344·4	344·3	353·6	8·6	26·1	45·0	64·0	82·3	98·9	112·0	118·1	114·6	107·7	109·2	119·8	134·4	151·2	168·9
	Jup. ...	138·4	137·6	137·3	137·2	137·6	138·2	139·1	140·2	141·4	143·1	144·8	146·7	148·6	150·7	152·8	155·0	157·2	159·5
	Sat ...	276·2	276·5	276·8	277·0	276·6	276·3	276·0	275·2	274·5	273·8	273·1	272·4	271·6	171·0	270·5	269·9	269·8	269·8
	Eng. date ..	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1756	Mars ...	86·8	91·7	96·5	101·8	107·1	112·6	118·3	124·0	130·0	136·0	142·0	148·2	154·4	160·9	167·3	173·9	180·4	187·1
	Merc .	332·9	346·4	3·5	22·0	41·0	59·8	76·9	91·1	99·2	97·7	90·6	89·8	99·2	113·2	130·0	147·7	165·5	182·7
	Jup. ...	172·0	170·7	169·6	168·8	168·0	167·5	107·5	167·7	168·3	169·1	170·2	171·4	173·1	174·8	176·7	178·5	180·7	182·7
	Sat. ...	287·2	287·6	287·9	288·4	288·2	288·1	288·0	287·4	286·8	286·2	285·4	284·6	283·9	283·2	282·5	281·8	281·6	281·4
1757	Mars ...	332·6	340·5	348·2	355·9	3·4	11·0	18·3	25·7	33·0	40·0	47·0	53·7	60·4	67·1	73·3	79·6	85·6	91·4
	Merc. ...	341·1	359·2	18·2	36·8	54·6	69·6	79·1	80·0	73·0	70·6	78·8	91·8	108·3	125·6	144·5	161·8	177·7	190·0
	Jup. ...	206·1	204·9	203·7	202·3	201·1	199·9	198·9	198·1	197·7	197·7	197·7	198·4	199·2	200·3	201·6	203·2	204·9	206·9
	Sat. ...	298·0	298·6	299·2	299·8	299·9	300·0	300·1	299·7	299·2	298·9	298·1	297·4	296·6	295·8	295·0	294·3	293·9	293·4
1758	Mars ...	108·6	111·3	114·8	118·9	123·3	128·1	133·1	138·6	144·1	149·8	155·7	161·6	168·1	174·3	180·9	187·4	193·9	200·9
	Merc. ...	355·4	14·1	32·0	47·6	58·8	61·7	55·5	51·4	57·2	70·0	86·4	104·3	122·7	140·8	157·0	170·9	178·8	177·7
	Jup. ..	239·3	239·1	238·3	237·6	236·4	235·5	233·8	232·4	231·3	230·1	229·4	229·0	228·7	228·9	229.5	230.2	231·4	232·7
	Sat. ...	309·0	309.7	310·5	311·3	311·7	312·0	312·3	312·0	311·8	311·6	311·0	310·4	309.7	308·8	308·1	307·2	306·6	306·0
	Eng. date ...	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1759	Mars ...	349·0	356·7	4·2	11·7	19·3	26·7	33·8	41·1	48·1	55·2	62·0	68·6	75·4	81·8	88·4	94·6	100·7	106·9
	Merc. ..	9·5	25·7	38·0	43·0	37·8	32·2	36·2	48·1	64·0	82·0	100·7	119·0	136·2	151·0	166·0	162·4	155·5	151·6
	Jup.	270·8	271·5	272·0	272·1	272·0	271·4	270·6	269·4	268·1	266·7	265·5	264·1	263·0	262·3	261·6	261·4	261·6	262·0
	Sat. ...	320·0	320·9	321·9	322·9	323·4	324·0	324·5	324·5	324·5	324·5	324·0	323·5	323·0	322·2	321·4	320·7	319·9	319·2
	Eng. date ...	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1760	Mars .	138·6	138·3	138·9	140·9	143·6	147·0	151·0	155·5	160·5	165·8	171·5	177·2	183·2	189·5	196·0	202·5	209·2	216·2
	Merc. ...	16·7	23·4	19·9	13·3	14·9	26·1	41·5	59·5	78·1	96·6	114·4	130·4	142·2	146·1	140·6	134·7	138·3	149·5
	Jup. ..	300·1	301·8	303·5	304·6	305·5	306·3	306·5	306·6	306·1	305·4	304·5	303·3	302·0	300·5	299·2	298·1	297·0	296·3
	Sat. ..	331·2	332·3	333·4	334·5	335·3	336·0	336·8	337·0	337·0	337·5	337·3	337·0	336·7	336·0	335·8	334·5	333·7	332·9
1761	Mars ...	4·6	12·1	19·3	26·7	33·8	41·0	48·2	55·2	62·1	68·8	75·6	82·4	88·7	95·3	101·9	108·2	114·4	120·4
	Merc	2·3	354·9	355·1	4·3	19·2	36·6	54·7	73·8	91·9	109·2	121·5	128·3	124·7	117·8	119·6	129·4	144·2	160·9
	Jup. ...	328·3	330·6	332·7	334·6	336·7	338·3	339·6	340·9	341·8	342·4	342·6	342·4	342·0	341·1	340·1	338·8	337·6	336·1
	Sat ...	342·5	343·7	344·9	346·2	347·1	348·1	349·1	349·6	350·2	350·6	350·6	350·5	350·4	349·9	349·4	348·8	348·0	347·2
1762	Mars	184·8	181·4	178·1	176·1	175·0	175·4	177·1	179·7	183·0	187·1	191·8	196·7	202·5	208·3	214·1	220·5	227·0	233·7
	Merc. ...	335·6	342·9	356·7	13·9	32·5	51·6	70·1	87·4	101·3	109·7	108·5	101·3	100·4	109·0	123·2	139·7	157·5	175·0
	Jup. ...	356·0	358·2	0·6	3·0	5·5	7·7	9·7	11·8	18·7	15·2	16·6	17·8	18·5	19·0	19·1	18·8	18·3	17·4
	Sat.	354·2	355·5	356·8	358·1	359·2	0·4	1·4	2·2	2·9	3·7	3·9	4·1	4·4	4·0	3·7	3·3	2·6	1·8
	Eng date ...	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1763	Mars ..	19·5	26·7	33·8	40·9	47·8	54·8	61·5	68·3	75·2	81·8	88·4	94·9	101·5	107·8	114·3	120·6	126·8	133·3
	Merc. ...	335·0	351·3	9·3	28·3	48·0	64·9	80·1	90·2	91·2	84·0	81·2	88·4	101·8	118·2	135·9	153·9	171·4	187·1
	Jup.	23·7	26·0	28·4	30·8	33·2	38·6	37·8	40·3	42·5	44·6	46·6	48·6	50·1	57·8	52·9	53·8	54·5	54·7
	Sat. ...	6·1	7·4	8·7	10·0	11·2	12·5	13·7	14·6	15·6	16·6	17·1	17·6	18·1	18·1	18·0	17·9	17·4	16·8
	Eng date .	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1764	Mars ...	235·5	237·1	237·9	237·5	236·0	233·9	230·6	228·5	226·7	226·2	226·7	228·7	231·7	235·5	240·1	245·2	250·9	256·7
	Merc. ...	346·9	5·5	24·4	42·4	58·3	69·9	73·0	66·9	62·1	68·0	80·2	96·3	114·2	132·4	150·3	166·2	180·4	188·2
	Jup. .	51·3	53·3	55·4	57·6	59·7	61·9	64·4	66·7	69·0	71·4	73·7	75·8	78·0	80·0	82·0	83·6	85·2	86·3
	Sat ...	18·3	19·6	20·9	22·3	23·6	24·9	26·2	27·4	28·5	29·6	30·3	31·1	31·8	32·0	32·3	32·5	32·2	31·8
1765	Mars ...	34·1	41·0	47·8	54·6	61·2	68·0	74·6	81·1	87·5	94·2	100·7	107·0	113·5	120·0	126·2	132·5	138·9	145·3
	Merc. ...	1·6	19·8	36·1	48·4	58·7	49·4	43·3	46·9	58·5	74·2	92·0	110·6	128·8	145·8	161·2	170·6	171·9	165·2
	Jup. .	80·1	81·4	82·7	84·2	86·0	88·1	90·0	92·2	94·5	96·8	99·0	101·3	103·6	105·7	107·9	110·1	112·1	113·9
	Ven. ...	344·0	356·5	9·0	21·1	33·6	46·0	58·3	70·5	82·7	94·9	107·4	119·2	131·5	143·7	156·1	168·2	180·6	193·0
	Sat ..	30·6	31·9	33·2	34·5	35·9	37·2	38·6	39·8	41·1	42·4	43·4	44·4	45·4	45·8	46·2	46·7	46·7	46·6

Mesh	Vrsh.	Mith.	Kat.	Sim	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

* * The 150th day of the Indian solar year corresponding to A.D. 1752-53 was the 26th August, but the 160th day was the 16th declared that the next day after Wednesday, 2nd September 1752, should be Thursday, 14th September 1752. In continental countries, in countries where it was adopted (i.e., all over Europe except the British Isles and Russia) the next day after 4th October 1582 was 15th

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Jy 4	Jy 14	Jy 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
168·4	175·0	181·5	188·2	194·7	201·5	208·1	215·0	221·8	**1753**	228·7	235·7	242·7	249·7	256·8	264·0	270·2	278·4	285·8	293·1
169·0	166·7	180·4	196·3	213·5	230·9	247·4	262·0	272·1		274·2	267·7	263·2	267·8	280·1	295·8	313·6	331·9	350·0	7·0
83·3	83·7	84·4	84·2	83·8	83·1	82·0	80·9	79·6		78·4	77·1	76·0	74·8	74·2	73·9	73·7	73·9	74·5	75·5
238·0	238·9	239·8	240·7	241·8	242·9	244·0	245·2	246·4		247·5	248·6	249·7	250·8	251·6	252·5	253·3	253·7	254·1	254·5
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
40·2	40·0	38·7	36·6	33·6	31·1	28·8	27·8	28·1	**1754**	29·8	31·5	34·3	35·0	42·0	46·4	51·2	56·3	61·5	67·0
160·3	175·9	193·0	210·4	227·2	242·4	254·1	258·4	253·6		247·3	249·7	260·1	274·8	291·8	309·8	328·2	345·0	0·2	10·4
112·2	113·5	114·7	115·8	116·3	116·8	116·8	116·5	115·9		115·0	113·9	112·7	111·4	110·0	108·8	107·8	107·0	106·4	106·3
248·3	249·1	249·8	250·6	251·6	252·7	253·8	254·9	256·2		257·3	258·5	259·6	260·7	261·7	262·6	263·6	264·1	264·7	265·3
180·9	187·6	194·2	201·1	208·0	214·9	221·9	229·0	236·2	**1755**	243·4	250·8	258·1	265·6	273·2	280·6	288·4	296·0	303·7	311·4
171·6	189·1	207·1	222·8	235·8	242·3	240·4	232·8	231·7		240·5	254·3	270·7	288·4	306·3	323·6	339·1	350·4	353·6	347·8
137·5	139·6	141·4	142·9	144·7	145·6	146·5	147·3	147·9		147·9	147·5	147·1	146·2	145·1	143·8	142·6	141·2	139·9	139·2
258·8	259·4	260·0	260·7	261·7	262·7	263·6	264·8	266·0		267·1	268·3	269·5	270·6	271·7	272·7	273·8	274·6	275·3	276·0
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 5	Mr 15	Mr 25	Ap 4
76·3	80·6	84·1	87·0	88·7	89·5	89·1	87·0	84·1	**1756**	80·6	76·7	74·1	72·8	71·9	72·9	74·8	77·5	80·9	84·9
186·6	203·1	216·9	225·7	228·1	218·8	215·5	221·6	234·2		250·0	267·3	285·2	302·5	318·1	330·4	335·5	331·4	325·0	327·4
161·7	163·7	165·8	167·9	169·9	171·7	173·2	174·7	176·0		176·9	177·6	177·7	178·1	177·7	177·1	176·2	175·1	174·1	172·7
269·7	270·2	270·6	271·1	272·0	272·9	273·8	274·7	275·7		276·6	277·8	279·0	280·1	281·2	282·4	283·5	284·5	285·5	286·4
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
194·0	200·9	207·8	214·7	221·7	228·8	236·1	243·5	250·9	**1757**	258·6	266·2	273·8	281·5	289·3	297·2	304·8	312·8	320·8	328·5
197·6	208·4	211·3	205·6	199·9	203·1	214·6	229·8	246·4		264·0	281·3	297·4	310·4	317·5	315·4	308·3	307·9	317·7	332·1
184·9	187·3	189·3	191·4	193·6	195·9	197·9	199·9	201·6		203·2	204·7	206·1	207·0	207·6	208·1	208·3	207·9	207·4	206·6
281·1	281·3	281·6	281·9	282·6	283·9	284·2	285·2	286·3		287·3	288·5	289·7	291·0	292·2	293·4	294·5	295·5	296·6	297·5
97·0	102·5	107·3	111·9	116·0	119·7	122·6	124·4	125·3	**1758**	125·3	123·8	121·0	117·5	114·0	110·2	107·4	106·3	106·2	107·7
195·5	192·0	184·9	186·0	195·6	209·5	225·9	243·8	260·6		277·0	290·8	299·4	299·7	292·0	289·6	297·2	310·2	327·3	345·6
208·9	210·9	213·1	215·3	217·5	219·7	227·8	224·2	226·3		228·4	230·4	232·2	233·9	235·6	236·9	237·8	238·7	239·8	239·8
292·9	293·0	293·1	293·1	293·7	294·3	294·9	295·9	296·9		297·8	299·0	300·2	301·3	302·5	303·7	305·0	306·1	307·3	308·4
207·8	214·7	221·9	229·0	236·3	243·9	251·3	258·9	266·5	**1759**	274·3	282·0	289·8	297·7	305·5	313·4	321·2	329·3	337·1	344·8
170·3	167·9	176·2	189·6	205·6	222·8	239·9	256·7	271·2		281·2	283·6	277·2	272·6	277·5	289·7	305·6	323·4	341·9	0·0
234·3	235·8	237·8	239·9	241·9	244·9	246·4	248·7	251·0		253·3	255·6	257·7	259·9	262·1	264·0	265·9	267·5	268·8	270·1
305·5	305·3	305·1	304·9	305·3	305·6	306·1	306·9	307·8		308·6	309·7	310·8	312·0	313·2	314·5	315·7	317·0	318·2	319·4
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 5	Mr 15	Mr 25	Ap 4
112·7	118·7	124·0	129·5	134·7	139·5	144·2	148·1	151·7	**1760**	154·3	156·4	157·3	157·1	155·4	152·3	148·7	144·8	141·6	139·5
157·4	169·8	185·3	202·2	219·7	236·5	251·6	263·2	268·2		263·1	256·6	258·9	269·5	284·3	301·5	319·7	338·0	355·4	10·6
262·8	263·8	265·1	266·7	268·4	270·4	272·5	274·6	276·6		279·0	281·3	283·8	286·0	288·4	290·8	293·1	295·3	297·8	299·3
318·4	318·1	317·7	317·3	317·4	317·6	317·8	318·4	319·1		319·8	320·9	322·0	323·0	324·2	325·4	326·6	327·9	329·2	330·5
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
223·0	230·1	237·3	244·6	252·1	259·6	267·2	275·0	282·8	**1761**	290·5	298·3	306·2	314·1	321·8	329·7	337·5	345·2	352·9	0·4
164·7	181·6	199·0	216·1	231·9	244·6	251·4	249·8	241·6		241·0	250·0	263·6	280·1	297·8	316·1	333·4	349·1	0·8	4·4
295·9	295·8	296·2	296·9	297·8	299·0	300·5	302·2	304·0		306·0	308·2	310·5	312·8	315·2	317·5	320·1	322·4	324·8	327·2
332·1	331·6	331·0	330·4	330·3	330·3	330·2	330·7	331·2		331·7	332·6	333·6	334·4	335·6	336·8	338·0	339·3	340·6	341·9
126·7	132·7	138·4	144·2	149·9	155·6	160·9	166·0	171·1	**1762**	175·7	180·0	184·0	187·2	190·0	191·8	192·3	191·8	189·5	186·8
177·8	195·8	212·2	225·9	234·9	235·1	228·1	224·2	230·3		243·6	259·4	276·9	294·7	312·0	328·0	340·3	346·1	341·9	335·6
334·7	333·6	332·7	332·1	331·8	332·0	332·4	333·8	334·3		335·5	337·2	339·0	340·9	343·0	345·2	347·5	349·9	352·3	354·5
346·4	345·6	344·9	344·1	343·7	343·4	343·2	343·4	343·7		344·0	344·7	345·5	346·2	347·3	348·4	349·6	350·9	352·1	353·5
240·7	247·8	254·9	262·2	269·6	277·4	284·8	292·5	300·3	**1763**	307·9	315·7	323·4	330·9	338·5	346·2	353·6	1·1	8·2	15·6
192·0	206·8	217·5	220·3	214·3	208·9	212·5	223·9	239·1		255·9	273·5	290·9	307·1	320·3	327·5	325·4	318·8	318·3	327·6
16·4	15·1	13·7	12·3	10·8	9·9	10·1	8·6	8·4		8·5	9·1	10·0	11·0	12·5	14·1	15·8	17·9	20·0	22·4
1·1	0·3	359·5	358·6	358·0	357·5	357·0	357·0	356·9		356·9	357·5	358·1	358·7	359·6	0·6	1·6	2·8	4·0	5·3
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 5	Mr 15	Mr 25	Ap 4
139·3	145·5	151·6	157·7	163·7	169·7	175·6	181·3	187·3	**1764**	193·0	198·6	203·9	209·1	214·2	219·0	223·5	227·7	231·1	234·2
199·3	204·7	201·0	194·0	194·8	204·6	218·7	235·1	252·6		270·0	286·5	300·5	309·1	309·3	302·2	299·6	306·9	320·6	337·3
54·8	54·3	53·7	52·6	51·4	50·1	48·7	47·4	46·3		45·2	41·5	44·2	44·1	44·4	45·0	46·0	47·3	48·7	50·3
16·1	15·3	14·5	13·6	12·9	12·2	11·5	11·2	10·9		10·6	10·9	11·2	11·5	12·4	13·2	14·0	15·1	16·3	17·5
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
263·0	269·5	276·2	283·1	290·2	297·3	304·6	311·9	319·1	**1765**	326·4	333·7	341·0	348·2	355·4	2·4	9·6	16·6	23·7	30·4
187·0	179·5	177·6	185·9	198·7	214·8	231·8	249·3	265·8		280·7	291·2	293·2	287·0	282·1	287·5	299·4	315·4	333·1	351·8
87·6	88·4	88·9	88·9	88·6	88·9	87·2	86·0	85·8		83·4	83·1	80·9	79·8	79·0	78·4	78·2	78·4	78·7	79·6
31·3	30·6	29·9	29·2	28·3	27·5	26·6	26·1	25·5		25·0	25·0	25·0	25·0	25·7	26·3	26·9	27·9	28·9	29·9
151·6	157·9	164·1	170·4	176·7	183·1	189·3	195·6	202·0	**1766**	208·2	214·5	220·8	227·0	233·3	239·5	245·7	251·8	257·9	263·9
160·9	166·8	178·9	194·6	211·5	228·8	245·6	260·9	272·5		276·9	272·6	265·9	268·4	278·7	294·3	311·3	329·5	347·9	5·3
115·7	117·4	118·6	119·7	120·5	121·1	121·1	121·1	120·6		119·7	118·7	117·6	116·3	115·0	113·6	112·6	111·5	111·0	110·7
205·0	217·2	229·3	241·5	253·3	265·2	276·9	288·6	299·8		310·8	321·0	330·7	339·3	346·4	351·2	352·9	351·8	346·6	340·8
46·5	45·9	45·3	44·7	43·8	43·0	42·1	41·4	40·7		39·9	39·7	39·5	39·2	39·5	39·8	40·1	41·0	41·8	42·7

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash	U. Ash.	Śrav	Dan	Satab.	P Bhad	U. Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

September because in the year A.D. 1752 the NEW STYLE was introduced into the United Kingdom by an Act of Parliament which except Russia, this change was carried out in A.D. 1582 when the Gregorian Calendar came into force in those countries under that reform and October 1582.

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle' Venus, A.D. 1765—A.D. 1999;

Year	Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ...	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1766	Mars .	266·9	272·7	278·2	283·3	288·3	292·9	296·9	300·2	302·6	304·0	304·4	302·6	300·4	297·8	295·7	294·8	295·1	296·5
	Merc ...	14·0	27·5	34·0	31·2	24·4	20·1	36·6	52·0	69·7	88·4	106·8	124·6	140·3	151·8	155·6	150·4	144·5	147·9
	Jup. ..	110·5	110·7	111·1	111·9	113·1	115·4	116·0	117·6	119·4	121·4	123·6	125·8	127·9	130·1	132·4	134·6	136·7	138·9
	Ven. ..	339·2	338·2	340·8	346·3	353·9	2·5	11·8	22·1	32·8	43·7	54·9	66·5	78·1	89·8	101·5	113·6	125·7	137·6
	Sat ...	43·4	44·7	46·0	47·2	48·5	49·8	51·2	52·5	53·8	55·1	56·3	57·4	58·6	59·3	60·1	60·8	61·0	61·2
	Eng. date .	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1767	Mars ...	49·0	55·3	61·8	68·2	74·5	80·9	87·2	93·6	99·9	106·3	112·6	119·0	125·2	131·7	138·1	144·8	150·8	157·3
	Merc ...	14·1	13·4	6·2	5·5	15·0	29·5	47·0	65·6	84·5	102·8	119·2	132·2	138·4	135·2	128·8	129·2	139·4	153·4
	Jup. ...	143·0	142·2	141·6	141·3	141·5	142·0	142·8	143·7	145·0	146·4	148·2	150·1	152·0	153·9	156·0	158·2	160·4	162·6
	Ven. ...	21·6	34·0	46·1	58·1	70·2	82·0	93·8	105·5	117·1	128·2	139·4	149·4	159·7	170·6	180·0	188·0	194·9	199·1
	Sat. ..	56·4	57·5	58·7	59·8	61·1	62·4	63·7	65·0	66·4	67·8	69·1	70·3	71·5	72·5	73·4	74·4	74·9	75·3
	Eng. date ...	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1768	Mars	289·5	296·5	303·5	310·7	317·6	324·4	331·2	337·7	344·0	350·2	355·8	1·1	5·8	10·0	13·2	15·4	16·1	15·6
	Merc. .	348·7	346·0	353·0	6·9	24·1	42·6	61·7	80·2	97·5	111·9	120·3	119·0	111·4	110·4	119·2	132·7	149·3	166·8
	Jup. ...	176·7	175·4	174·1	173·3	172·5	171·7	171·6	171·6	172·0	172·8	173·7	175·0	176·4	178·2	180·0	181·9	183·9	186·1
	Ven. .	326·8	338·8	351·0	3·1	15·3	27·5	39·8	52·0	64·1	76·3	88·4	100·6	113·0	125·4	137·8	150·1	162·4	174·9
	Sat. ...	69·6	70·6	71·5	72·5	73·7	75·0	76·2	76·6	78·9	80·2	81·5	82·8	84·2	85·3	86·4	87·5	88·3	89·0
1769	Mars ...	63·7	69·7	75·5	81·6	87·7	93·7	99·8	106·0	112·1	118·4	124·6	130·8	137·2	143·5	149·9	156·4	162·8	169·4
	Merc. ...	332·8	345·1	1·5	19·8	38·8	57·8	75·3	90·5	100·8	101·7	94·7	91·8	98·6	111·6	127·9	145·5	163·4	180·8
	Jup. ...	210·8	209·7	208·4	207·1	205·7	204·6	208·6	202·7	202·0	201·8	201·9	202·2	203·0	204·1	205·3	207·7	208·3	209·2
	Ven. ..	44·8	52·6	58·6	62·2	62·1	58·5	52·6	47·8	45·1	48·2	53·4	60·8	69·5	79·0	89·2	100·0	110·9	122·3
	Sat. .	83·2	84·0	84·7	85·4	86·5	87·6	88·7	89·9	91·4	92·6	93·9	95·2	96·6	97·9	99·1	100·8	101·2	102·2
1770	Mars ...	308·4	316·0	323·6	331·2	338·7	346·2	353·5	0·7	8·0	14·9	21·7	28·4	34·7	40·7	46·6	51·9	56·5	61·5
	Merc. ...	339·3	357·1	15·8	34·7	52·8	68·8	80·2	83·9	77·9	73·1	78·4	90·6	106·5	124·0	142·0	160·1	176·4	189·7
	Jup. ...	243·9	243·6	243·1	242·3	241·3	240·0	238·8	237·4	236·2	235·1	234·0	233·5	233·1	233·3	233·5	234·3	235·3	236·4
	Ven. ...	3·4	15·8	28·1	40·5	52·7	64·8	77·1	89·2	101·4	113·2	125·4	137·4	149·3	161·1	172·9	184·7	196·3	207·5
	Sat. ..	96·9	97·3	97·8	98·3	99·3	100·2	101·1	102·3	103·4	104·7	106·1	107·4	108·7	110·0	111·2	112·5	113·6	114·7
	Eng. date ...	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1771	Mars ...	79·9	85·0	90·3	95·9	101·4	107·1	113·0	118·8	124·8	130·9	137·0	143·2	149·6	155·9	162·3	168·7	175·3	182·0
	Merc. ..	353·3	11·8	30·1	46·8	59·6	64·8	60·5	54·4	57·9	68·8	84·6	102·1	120·5	138·6	155·6	170·3	180·0	181·2
	Jup. .	275·0	275·9	276·4	276·7	276·7	276·4	275·5	274·5	273·3	272·1	270·8	269·5	268·2	267·2	266·6	266·1	266·1	266·4
	Ven ...	314·2	325·0	336·4	347·7	359·7	11·2	23·0	34·9	46·9	58·9	70·7	82·8	94·8	107·2	119·2	131·9	144·1	156·3
	Sat. ...	110·8	110·9	111·1	111·3	112·1	112·8	113·5	114·6	115·7	116·8	118·1	119·4	120·5	121·9	123·2	124·5	125·7	126·8
	Eng date ...	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 18	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1772	Mars ..	326·0	333·8	341·6	349·2	356·8	4·4	11·8	19·1	26·4	33·5	40·8	47·3	53·9	60·5	66·8	72·9	78·9	84·5
	Merc. ...	7·5	24·4	38·1	45·6	42·7	35·6	37·2	47·0	62·2	79·9	98·3	116·7	134·5	150·0	161·6	165·4	160·2	154·0
	Jup. ...	304·1	305·8	307·6	308·9	309·9	310·9	311·2	311·5	311·2	310·8	310·0	308·8	307·6	306·1	304·8	303·5	302·4	301·5
	Ven ..	38·5	49·9	61·6	72·5	83·3	93·4	103·1	112·1	119·6	125·1	128·1	127·5	123·5	117·5	113·0	112·0	115·0	120·5
	Sat. .	124·7	124·5	124·4	124·3	124·8	125·3	125·8	126·7	127·6	128·5	129·7	130·9	132·2	133·5	134·8	136·0	137·2	138·4
1773	Mars ..	99·6	103·0	107·1	111·7	116·5	121·7	127·4	132·6	138·4	144·2	150·2	156·4	162·6	168·9	175·3	181·8	188·6	195·3
	Merc ...	13·6	25·3	24·4	17·4	16·4	25·4	40·1	57·4	75·9	94·6	112·7	129·1	142·2	148·1	145·1	137·9	137·0	148·4
	Jup. ...	332·2	334·4	336·6	338·6	340·6	342·4	344·0	345·2	346·4	347·1	347·6	347·5	347·4	346·6	345·8	344·4	343·3	341·9
	Ven. ...	344·5	357·2	9·7	21·8	34·3	46·7	58·9	71·1	83·4	95·6	108·0	119·9	132·2	144·4	156·8	169·0	181·8	198·6
	Sat. ...	138·4	138·1	137·7	137·5	137·7	138·0	138·2	138·9	139·7	140·3	141·4	142·5	143·6	144·8	146·0	147·3	148·6	149·9
	Eng date	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1774	Mars ..	342·8	350·6	358·1	5·8	13·3	20·7	28·0	35·2	42·5	49·4	56·3	63·0	69·6	76·3	82·8	89·0	95·2	101·1
	Merc. ...	6·5	359·9	356·8	3·9	17·5	34·6	53·0	72·0	90·7	107·8	121·9	130·3	129·2	122·0	120·7	129·0	142·4	158·9
	Jup .	359·6	2·2	4·6	7·2	9·4	11·6	13·9	15·9	17·9	19·4	20·9	22·3	23·2	23·7	24·1	24·0	23·5	22·9
	Ven. ..	335·4	336·4	339·7	345·7	353·7	2·6	11·9	22·4	33·2	44·2	55·4	67·0	78·7	90·3	102·1	114·2	126·3	138·3
	Sat ..	152·1	151·5	151·0	150·4	150·4	150·4	150·4	150·9	151·5	151·9	152·8	153·7	154·7	155·9	157·0	158·2	159·5	160·8
	Eng date ...	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl. 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1775	Mars ..	125·4	126·4	128·5	131·2	134·8	138·9	143·5	148·4	153·7	159·2	165·1	170·9	177·1	183·3	189·8	196·3	203·1	209·9
	Merc. . .	338·0	342·9	355·6	12·0	30·2	49·1	68·0	86·2	100·9	111·0	112·6	105·7	102·5	108·6	121·4	137·8	155·3	173·0
	Jup	27·5	29·8	32·1	34·5	36·9	39·3	41·6	44·0	46·3	48·4	50·5	52·5	54·1	55·9	57·1	58·2	58·9	59·4
	Ven	22·3	34·6	46·7	58·7	70·8	82·6	94·3	106·0	117·5	128·6	139·7	149·8	159·9	170·5	179·5	187·2	193·6	196·8
	Sat. ...	165·4	164·7	164·0	163·4	163·1	162·9	162.6	162·8	163·1	163·4	164·2	165·0	165·8	166·9	167·9	169·0	170·2	171·4
	Eng. date ...	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1776	Mars.	358·5	6·1	13·7	21·0	28·4	35·5	40·11	49·7	56·7	63·5	70·5	77·0	83·8	90·5	96·7	103·0	109·2	115·3
	Merc ...	333·9	349·4	7·3	25·8	44·8	63·5	78·9	91·1	94·5	89·0	83·8	88·8	100·8	116·5	133·8	151·8	169·5	185·7
	Jup ..	55·2	57·1	59·1	61·2	63·5	65·5	67·9	70·2	72·6	74·6	77·2	79·4	81·7	83·6	85·6	87·5	89·1	90·4
	Ven. ..	327·4	339·4	351·8	3·8	16·0	28·2	40·5	52·7	64·9	77·0	89·1	101·6	113·5	126·1	138·5	150·8	163·2	175·6
	Sat. ...	178·4	177·6	176·9	176·1	175·7	175·2	174·7	174·8	174·9	174·9	175·4	176·0	176·6	177·5	178·5	179·4	180·6	181·8
1777	Mars ...	164·2	161·3	159·9	169·7	160·3	162·4	165·8	168·9	173·0	177·7	182·9	188·3	194·2	200·3	206·4	213·0	219·6	226·5
	Merc. ...	344·9	3·3	22·3	40·6	57·2	70·1	75·7	71·7	65·4	68·1	79·3	94·7	112·1	130·4	148·3	165·3	179·7	189·3
	Jup. ...	84·0	85·2	86·5	88·0	89·8	91·7	93·6	95·7	97·9	100·2	102·3	104·6	106·9	109·2	111·4	113·5	115·6	117·5
	Ven. ...	44·3	51·8	57·2	59·9	58·8	54·8	48·9	44·9	42·2	47·2	52·8	60·6	69·5	79·1	89·4	100·4	111·3	122·8
	Sat ...	191·0	190·2	189·4	188·6	188·1	187·5	186·8	186·7	186·6	186·3	186·7	187·0	187·0	187·8	189·1	189·9	191·0	192·1

Mesh.	Vrsh.	Mith.	Kat	Sim	Kan.	Tul.	Vrsch	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
299·4	303·0	307·5	312·1	317·4	323·1	328·9	334·9	341·1	**1767**	347·5	354·2	0·1	6·5	13·0	19·4	25·9	32·5	38·8	45·3
159·1	174·1	191·0	208·3	225·5	241·2	258·9	260·5	2 8 1		250·7	250·5	259·0	273·2	290·0	307·8	326·1	348·6	359·3	11·1
141·0	142·9	144·8	146·5	148·0	149·4	150·6	151·3	152·0		152·1	151·9	151·6	150·9	149·8	148·5	147·3	145·7	144·7	143·5
150·2	162·3	174·9	187·1	199·7	212·2	224·8	237·5	250·1		262·8	275·3	288·1	300·6	313·2	325·7	338·2	350·6	3·1	15·4
61·4	61·0	60·7	60·2	59·5	58·7	57·9	57·1	56·8		55·5	55·0	54·5	53·9	54·0	54·0	54·0	54·6	55·3	55·9
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 5	Mr 15	Mr 25	Ap 4
163·7	170·2	176·6	183·1	189·7	196·4	202·9	209·5	216·2	**1768**	223·0	229·8	236·7	243·6	250·5	257·4	264·4	271·4	278·5	285·5
170·1	187·0	205·1	221·4	235·1	243·8	244·0	236·6	233·4		239·9	252·9	268·7	286·3	304·2	321·9	337·9	350·7	356·2	358·0
164·8	166·9	169·0	171·1	173·2	175·0	176·7	178·2	179·5		180·6	181·5	181·9	182·1	182·1	181·7	180·8	179·9	178·7	177·3
200·1	198·1	192·8	187·8	185·3	186·7	191·6	198·8	207·0		217·0	227·4	238·2	249·4	260·9	272·5	284·5	296·5	308·4	320·5
75·8	75·7	75·6	75·5	74·9	74·2	73·7	72·8	71·9		71·1	70·4	69·7	68·9	68·7	68·4	68·2	68·6	68·9	69·3
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		'Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
13·8	11·8	8·7	6·5	5·8	5·7	6·5	8·6	11·4	**1769**	14·9	18·8	23·8	28·0	33·0	38·3	43·6	49·2	55·1	60·7
184·5	201·2	215·9	226·5	229·3	222·9	217·7	221·8	233·0		218·0	265·4	283·3	300·4	316·8	330·2	337·8	336·1	328·6	328·4
188·1	190·4	192·5	194·8	197·0	199·0	201·3	203·2	205·1		206·8	208·3	209·7	210·9	211·7	212·3	212·5	212·3	212·0	211·3
187·8	199·7	212·2	224·6	237·1	249·4	262·1	274·4	286·9		299·1	311·2	323·2	335·2	346·8	358·3	9·5	20·2	30·6	40·1
89·7	89·9	90·0	90·2	89·8	89·5	89·0	88·2	87·4		86·7	85·9	85·1	84·2	83·8	83·3	82·8	82·8	82·8	82·9
176·0	182·5	189·2	196·0	202·7	209·6	216·4	223·4	230·5	**1770**	237·7	244·9	252·1	259·4	266·8	274·3	281·7	289·1	296·7	304·4
196·4	208·6	218·7	209·9	202·9	203·8	213·4	227·8	243·8		261·9	279·4	296·0	310·0	319·8	319·3	312·7	309·9	317·1	330·5
212·2	214·1	216·4	218·6	220·7	223·1	225·2	227·4	229·7		231·8	233·7	235·8	237·5	239·1	240·7	241·8	242·8	243·5	243·7
134·0	146·8	157·7	169·7	181·9	194·3	206·5	219·1	231·8		244·1	256·8	269·4	281·6	294·5	307·1	319·6	332·1	344·5	357·0
103·1	103·5	103·9	104·3	104·2	104·1	104·0	103·4	102·7		102·0	101·2	100·3	99·5	98·8	98·2	97·5	97·3	97·0	96·8
65·5	68·6	70·8	72·1	72·1	70·7	68·2	65·0	61·6	**1771**	58·5	56·8	56·4	57·0	58·8	61·3	64·8	68·5	72·9	77·5
197·4	195·9	188·4	186·9	194·9	207·9	224·0	241·3	258·7		275·4	290·1	300·7	302·9	296·3	291·9	297·2	309·1	325·5	343·2
238·0	239·6	241·5	243·4	245·6	247·8	250·0	252·2	254·6		256·8	259·0	261·4	263·6	265·8	267·7	269·6	271·3	273·0	274·3
218·7	229·7	240·0	249·8	258·7	266·4	272·2	275·5	275·0		271·2	266·1	261·6	261·8	265·0	271·3	278·9	288·2	297·9	308·5
115·5	116·4	117·1	117·8	117·9	118·0	118·2	117·2	117·3		116·9	116·1	115·4	114·6	113·8	113·0	112·2	111·7	111·3	110·8
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 5	Mr 15	Mr 25	Ap 4
188·7	195·5	202·3	209·2	216·2	223·4	230·6	237·8	215·2	**1772**	252·7	260·0	267·6	275·3	282·9	290·6	298·5	306·3	314·0	321·9
174·2	170·3	176·2	188·2	203·7	220·7	238·0	255·1	270·2		282·0	286·1	281·5	275·8	278·0	288·6	303·7	321·2	339·6	358·0
267·0	267·9	269·1	270·6	272·2	274·1	275·0	278·1	280·4		282·6	284·9	287·4	289·6	292·0	294·5	296·8	298·9	301·9	303·1
168·8	181·2	193·8	206·4	218·9	231·4	244·1	256·7	269·4		282·0	294·5	306·9	319·3	331·9	344·0	356·4	8·1	20·5	32·5
128·0	128·8	129·7	130·6	131·0	131·4	131·8	131·6	131·5		131·2	130·5	129·8	129·2	128·4	127·7	126·9	126·2	125·6	125·0
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
89·9	94·8	99·4	103·4	109·9	109·6	111·6	112·3	112·0	**1773**	110·0	107·2	103·5	99·7	96·5	94·3	93·4	93·8	95·4	97·9
157·5	168·6	183·4	200·1	217·6	234·6	250·5	263·1	270·4		267·4	260·1	259·8	268·5	282·6	299·5	317·6	335·9	353·6	9·4
301·0	300·8	300·8	301·4	302·2	303·3	304·6	306·2	307·9		309·9	312·0	314·2	316·6	319·0	321·2	323·8	326·6	328·6	330·7
128·2	137·2	147·2	157·3	168·5	179·6	191·1	203·1	215·0		226·9	239·3	251·7	264·0	276·3	288·6	301·1	313·6	325·9	338·4
139·7	140·7	141·7	142·7	143·6	144·0	144·6	144·6	144·7		144·7	144·3	143·8	143·1	142·6	141·8	141·0	140·3	139·5	138·7
202·7	209·1	216·1	223·3	230·4	237·7	245·1	252·8	260·3	**1774**	268·0	275·8	283·5	291·2	299·1	307·0	314·9	322·9	330·6	338·6
163·1	179·6	197·1	214·1	230·5	244·4	253·0	252·9	245·5		242·8	249·2	262·2	278·3	295·9	314·1	331·8	348·1	1·0	7·2
340·5	339·2	338·2	337·4	336·9	336·9	337·0	337·7	338·6		339·8	341·3	343·1	344·8	346·8	349·1	351·3	353·7	356·0	358·5
205·7	217·8	230·0	242·1	253·9	265·7	277·4	288·9	300·1		310·9	320·9	330·3	338·4	344·9	348·8	349·3	346·9	342·2	337·1
151·1	152·2	153·8	154·4	155·2	155·9	156·7	157·0	157·3		157·6	157·4	157·4	156·9	156·2	155·6	154·8	154·1	153·3	152·4
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 15	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
107·0	112·8	118·0	123·2	128·0	132·5	136·4	139·2	142·5	**1775**	144·2	145·2	144·2	142·4	139·5	135·5	132·1	128·8	126·2	123·5
176·3	193·7	210·6	225·1	235·6	237·9	232·2	226·8	230·7		242·2	257·5	274·7	292·5	310·2	326·9	340·2	348·2	346·6	339·5
21·9	20·6	19·2	17·8	16·5	15·4	14·4	13·7	13·3		13·7	13·7	14·5	15·5	16·7	17·9	20·0	21·9	23·9	26·1
150·9	163·0	175·7	187·7	200·4	212·8	225·5	238·2	250·8		263·5	276·0	288·8	301·3	313·9	326·4	338·9	351·3	3·7	16·1
162·0	163·1	164·3	165·4	166·4	167·3	168·3	168·7	169·2		169·7	169·7	169·7	169·7	169·1	168·6	168·1	167·3	166·6	165·8
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 5	Mr 15	Mr 25	Ap 4
216·8	224·0	231·0	238·4	245·8	253·3	260·9	268·5	276·3	**1776**	284·0	291·9	299·9	307·7	315·5	323·3	331·3	339·1	346·7	354·5
190·3	205·7	218·0	223·5	218·6	211·0	213·0	222·8	237·2		253·7	271·3	289·1	305·7	320·1	329·1	329·6	322·5	319·9	327·0
59·5	59·5	58·8	57·9	56·8	55·5	54·1	52·9	51·6		50·5	49·6	49·1	48·9	49·1	49·4	50·2	51·4	52·6	54·3
196·8	194·0	188·7	184·6	183·2	185·4	190·9	198·5	206·9		217·1	227·6	238·5	249·8	261·4	273·0	285·1	297·0	309·0	321·1
172·6	173·8	175·0	176·3	177·3	178·3	179·3	179·9	180·6		181·4	181·6	181·8	181·9	181·6	181·2	180·9	180·2	179·4	178·8
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
121·4	127·3	133·0	138·7	144·2	149·5	154·6	159·4	163·9	**1777**	168·2	171·6	174·5	176·8	177·6	177·8	176·3	173·5	169·8	165·9
199·1	206·4	205·2	197·5	196·0	204·0	217·1	233·3	250·4		267·9	284·8	299·7	310·3	312·7	306·6	301·7	307·2	319·3	335·5
91·8	92·6	93·0	93·6	93·3	92·6	92·1	91·2	89·5		88·6	87·3	86·0	84·9	83·9	83·1	82·8	82·7	83·0	83·7
188·0	200·4	212·9	225·3	237·8	250·1	262·7	275·1	287·5		299·7	311·8	323·8	335·7	347·3	358·7	9·8	20·4	30·6	39·7
183·0	184·2	185·4	186·6	187·7	188·8	189·9	190·7	191·5		192·4	193·8	193·2	193·6	193·4	193·3	193·2	192·6	192·0	191·4
233·6	240·6	247·9	255·2	262·6	270·1	277·8	285·5	293·2	**1778**	301·0	308·8	316·5	324·2	331·9	339·7	347·3	354·8	2·3	9·7
190·5	183·5	179·7	185·4	197·4	212·8	229·6	247·2	264·3		279·6	291·3	296·0	291·4	285·1	287·6	298·5	313·7	331·2	349·7
119·3	120·9	122·3	123·5	124·4	125·1	125·4	125·4	125·2		124·5	123·5	122·5	121·2	119·9	118·6	117·3	116·2	115·5	115·0
134·6	146·4	158·3	170·3	182·6	194·9	207·1	219·7	232·7		244·8	257·5	270·1	282·3	295·1	307·8	320·3	332·7	345·2	357·7
193·2	194·4	195·6	196·7	197·9	198·9	200·2	201·0	202·1		203·0	203·6	204·1	204·7	204·8	204·9	205·0	204·5	204·1	203·6

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa	Anur.	Jyesh.	Mula	P. Ash.	U. Ash.	Śrav.	Dan.	Satab	P. Bhad.	U Bhad.	Revati
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle.

Venus, A.D. 1765—A.D. 1909;

Year	Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ...	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1778	Mars ...	13·6	21·0	28·1	35·4	47·4	49·8	56·4	63·2	70·1	76·7	83·4	90·1	96·5	103·1	109·4	115·6	122·2	128·8
	Merc. .	359·6	17·9	34·9	48·8	56·3	54·2	47·1	47·6	57·8	72·8	90·1	108·5	126·8	144·4	159·8	171·1	175·0	169·4
	Jup. ...	114·8	114·9	115·8	115·9	117·0	118·2	119·6	121·2	123·0	125·0	127·1	129·2	131·4	133·4	135·6	138·0	140·2	142·4
	Ven. .	4·1	16·5	28·8	41·2	53·4	65·5	77·8	89·9	102·0	113·9	126·0	138·0	149·9	161·7	173·4	185·2	196·7	207·8
	Sat. ...	203·3	202·5	201·7	201·0	200·3	199·6	198·9	198·6	198·2	197·8	198·0	198·1	198·4	199·0	199·7	200·3	201·2	202·2
1779	Mars ...	218·0	217·0	214·9	212·1	208·9	206·1	204·5	204·0	204·8	206·9	209·7	213·4	217·8	222·9	228·2	234·0	240·3	246·7
	Merc. ...	12·5	27·4	37·5	35·9	28·7	27·4	36·3	50·5	68·2	86·0	104·7	122·8	139·1	152·1	157·8	155·3	147·8	149·0
	Jup. ...	147·8	146·7	146·0	145·6	145·5	145·9	146·6	147·5	148·8	150·0	151·6	153·4	155·2	157·3	159·4	161·4	163·7	165·9
	Ven. ...	314·5	325·4	336·8	348·2	0·2	11·8	23·6	35·5	47·5	59·5	71·3	83·5	95·5	107·8	119·9	132·5	144·8	157·0
	Sat. ..	215·3	214·6	213·9	213·1	212·3	211·5	210·8	210·3	209·8	209·3	209·3	209·2	209·2	209·6	210·1	210·6	211·5	212·4
	Eng. date ...	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1780	Mars ...	28·4	35·5	42·2	49·2	56·0	62·8	69·6	76·2	82·6	89·3	95·9	102·3	108·7	115·2	121·6	128·0	134·2	140·6
	Merc. ..	15·5	17·5	10·7	7·4	14·7	28·1	45·5	63·4	82·4	101·3	117·9	131·9	140·2	139·4	132·6	130·5	138·8	152·1
	Jup. ...	181·4	180·1	179·8	177·3	176·8	176·7	175·7	175·6	175·9	176·4	177·5	178·5	179·4	181·5	183·4	185·1	187·2	189·2
	Ven. ...	39·0	50·4	62·0	72·8	88·5	93·5	103·0	111·6	118·8	123·7	125·7	124·1	119·5	113·9	110·2	110·3	113·9	120·0
	Sat. .	226·9	226·3	225·7	225·1	224·3	223·5	222·8	222·1	221·5	220·8	220·6	220·3	22 ·2	220·4	220·7	221·0	221·7	222·4
1781	Mars ...	256·2	260·7	265·2	269·0	272·0	274·4	275·5	275·7	275·1	272·8	270·0	268·1	264·4	266·6	267·2	269·7	273·1	277·2
	Merc. ...	353·8	348·5	353·3	6·0	22·3	40·5	59·6	78·3	96·0	111·0	121·2	122·9	116·2	112·7	118·6	131·4	147·3	164·6
	Jup. ...	215·5	214·4	213·2	211·9	210·5	209·4	208·3	207·3	206·6	206·1	206·1	206·4	206·9	207·8	209·0	210·2	211·9	213·8
	Ven. ...	345·0	357·9	10·4	22·5	35·0	47·4	59·6	71·8	84·0	96·3	108·7	120·6	132·8	145·0	157·6	169·7	182·0	194·3
	Sat. ...	238·3	238·0	237·7	236·9	236·2	235·4	234·7	234·0	233·3	232·5	232·0	231·6	231·2	231·3	231·5	231·5	232·1	232·7
	Eng. date ...	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1782	Mars ...	43·1	49·6	56·1	62·7	69·3	75·8	82·3	88·6	95·2	101·5	107·9	114·2	120·7	127·1	133·4	139·8	146·2	152·5
	Merc. ..	332·4	344·0	359·8	17·6	36·5	55·5	73·8	89·8	101·5	105·3	99·6	94·5	98·9	110·8	126·2	143·5	161·3	178·9
	Jup. ...	248·2	218·0	247·8	247·0	245·2	244·9	243·7	242·4	241·1	239·6	238·8	238·1	237·7	237·6	237·7	238·4	239·2	240·4
	Ven. ...	333·6	334·6	338·8	345·1	353·5	2·5	11·8	22·6	33·5	44·6	55·8	67·6	79·2	90·8	102·6	114·8	126·9	138·9
	Sat. ...	249·4	249·1	249·0	248·6	247·9	247·3	246·6	245·9	245·1	244·4	243·7	243·2	243·4	242·5	242·3	242·8	242·6	243·1
1783	Mars ...	281·1	287·9	294·3	301·0	307·5	313·8	319·8	325·6	331·3	336·3	340·9	344·5	349·2	348·8	349·2	348·1	340·0	343·5
	Merc. ...	337·6	355·1	13·6	32·5	51·1	67·7	80·6	86·7	82·7	76·3	78·8	89·6	104·3	122·0	140·1	158·0	174·5	189·2
	Jup. ...	278·9	280·0	280·8	281·2	281·4	281·1	280·7	279·4	278·5	277·3	276·3	274·8	273·4	272·3	271·5	271·1	270·8	270·9
	Ven. ...	22·9	35·2	47·3	59·3	71·4	83·1	94·8	106·5	117·9	128·9	140·0	150·1	160·2	170·3	179·1	186·4	192·3	194·5
	Sat ...	260·4	260·3	260·3	260·2	259·6	259·0	258·4	257·6	256·8	256·1	255·4	254·8	254·1	253·9	253·7	253·2	253·5	253·7
	Eng. date ...	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1784	Mars ...	57·9	63·9	70·2	76·2	82·3	88·6	94·9	101·1	107·3	113·6	120·0	126·2	132·6	138·9	145·2	151·6	158·1	164·6
	Merc. .	351·0	9·9	22·2	45·4	59·5	67·0	65·3	58·2	58·7	69·3	82·9	100·1	118·2	136·7	158·8	169·3	180·7	184·2
	Jup. ..	308·0	309·8	312·7	313·1	314·3	315·2	316·0	316·2	316·3	315·9	315·3	314·4	313·1	311·8	310·5	309·0	307·8	306·9
	Ven.	328·0	340·1	352·5	4·6	16·7	28·9	41·1	53·5	65·6	77·7	89·8	102·3	114·0	126·8	139·2	151·5	163·9	176·3
	Sat. ...	271·3	271·4	271·6	271·7	271·3	270·9	270·5	269·7	268·9	268·2	267·5	266·8	266·0	265·6	265·1	264·5	264·6	264·6
	Eng date .	Ap 9	Ap 19	Ap 29	My 9	M 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1785	Mars ...	301·0	308·5	316·0	323·2	330·9	338·1	345·6	352·5	359·6	6·4	12·8	19·2	25·1	30·9	36·3	40·8	45·0	48·6
	Merc- .	5·8	23·0	37·8	46·9	47·1	40·0	38·5	46·5	60·9	77·9	96·3	114·7	132·7	148·8	161·7	167·7	164·6	157·4
	Jup. .	336·0	338·2	340·5	342·6	344·6	346·6	348·1	349·6	350·9	351·7	352·4	352·6	352·5	352·1	351·3	350·2	349·1	347·7
	Ven. ...	44·0	51·0	55·9	57·7	55·6	50·6	45·2	42·0	39·3	46·1	52·3	60·4	69·6	79·2	89·6	100·7	111·7	123·3
	Sat. ...	282·1	282·4	282·8	283·1	282·9	282·6	282·4	281·8	281·1	280·5	279·7	278·9	278·2	277·5	276·9	276·3	276·1	276·0
	Eng. date ...	Ap 10	A 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1786	Mars ...	73·3	78·9	84·4	90·1	95·9	101·8	107·8	113·7	119·7	125·8	132·0	138·3	144·6	151·0	157·3	163·9	170·4	176·9
	Merc. ...	15·8	26·7	28·5	21·6	18·6	25·1	38·7	55·8	73·6	92·3	110·7	127·7	141·9	149·8	149·3	141·7	140·3	148·0
	Jup. ..	3·8	6·2	8·6	10·9	13·4	15·6	17·8	19·9	21·8	23·7	25·3	26·6	27·8	28·5	29·0	29·1	28·7	28·1
	Ven. .	4·8	17·2	29·5	41·9	54·1	66·2	78·0	90·6	102·6	114·5	126·6	138·6	150·4	162·2	173·9	185·6	197·1	208·2
	Sat. ...	293·0	293·6	294·1	294·6	294·5	294·6	294·6	294·1	293·6	293·2	292·3	291·5	290·6	289·9	289·3	288·7	288·4	288·0
1787	Mars .	319·2	327·0	334·8	342·4	350·0	357·5	5·1	12·3	19·6	26·7	33·7	384·4	47·0	53·5	59·6	65·7	71·4	76·7
	Merc. ...	10·0	4·7	359·4	4·2	16·5	32·6	50·9	69·7	88·7	105·6	121·3	131·7	133·0	128·4	122·6	128·8	141·2	159·9
	Jup. .	31·1	33·5	35·8	38·1	40·6	42·8	45·2	47·7	49·9	52·2	54·2	56·3	58·0	59·8	61·3	62·5	63·4	64·1
	Ven. ...	314·8	325·9	337·3	348·7	0·7	12·3	24·2	36·1	48·1	60·2	72·0	84·2	96·2	108·5	120·6	133·2	145·5	157·7
	Sat.	303·8	304·5	305·4	306·0	306·2	306·4	306·6	306·2	305·9	305·6	305·0	304·4	303·6	302·8	302·0	301·2	300·7	300·2
	Eng. date ...	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1788	Mars ...	91·4	95·6	100·2	105·2	110·5	116·8	121·4	127·0	132·9	138·9	144·8	151·0	157·4	163·6	170·0	176·0	183·3	190·0
	Merc .	341·2	343·2	354·7	10·1	28·0	46·8	65·9	84·0	99·9	111·8	115·8	110·3	104·8	108·5	120·6	135·9	153·0	170·7
	Jup. ...	59·9	60·8	62·8	64·9	66·9	69·1	71·5	73·7	76·1	78·4	80·6	82·9	85·2	87·4	89·4	91·3	93·0	94·4
	Ven. ...	39·5	50·9	62·4	73·1	88·7	93·6	102·9	111·1	117·9	122·3	123·2	120·7	115·5	110·2	107·4	108·5	112·9	119·4
	Sat.	314·8	315·7	316·6	317·5	317·9	318·4	318·9	318·8	318·6	318·6	318·0	317·5	316·8	316·0	315·2	314·4	313·7	313·0
1789	Mars ..	336·3	344·0	351·8	359·4	7·0	14·5	22·0	29·1	36·4	43·4	50·3	57·1	63·9	70·4	76·8	83·0	89·2	95·1
	Merc ...	333·2	347·8	5·3	24·1	43·1	61·6	78·2	91·3	97·3	93·8	87·2	89·0	99·8	114·7	131·8	149·7	167·4	184·1
	Jup .	88·2	89·1	90·3	91·9	93·8	95·2	97·0	99·2	101·3	103·5	105·7	108·1	110·3	112·5	114·8	116·9	119·0	121·1
	Ven. ...	345·5	358·6	11·1	23·2	35·7	48·1	60·3	72·4	84·7	97·0	109·3	121·3	133·5	145·7	158·3	170·5	182·7	195·0
	Sat. ...	326·0	327·0	328·1	329·1	329·8	330·4	331·0	331·2	331·4	331·5	331·1	330·7	330·3	329·6	329·4	328·0	327·2	326·4

Mesh.	Vrsh.	Mith.	Kat.	Sim.	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

V-B.—*cont.*

Mars., A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
134·5	140·4	146·6	152·5	158·4	164·2	169·9	175·6	181·1	**1779**	186·5	191·7	196·4	201·2	206·5	209·3	212·7	215·4	217·2	218·2
163·5	167·0	177·8	192·7	209·8	226·7	243·9	259·6	272·5		279·2	276·8	269·6	269·1	278·4	292·6	309·3	327·5	345·5	3·9
144·4	146·5	148·4	150·1	151·6	153·0	154·2	155·2	155·9		156·3	156·2	155·9	155·4	154·4	153·1	151·9	150·7	149·2	143·2
219·0	229·8	239·9	249·5	258·1	265·3	270·4	272·7	271·1		266·8	262·0	258·8	259·9	263·9	270·9	278·7	288·1	298·1	308·7
203·2	204·4	205·6	206·7	207·9	209·1	210·2	211·3	212·3		213·4	214·0	214·7	215·5	215·8	216·0	216·3	216·2	215·8	215·6
																Mr 5	Mr 15	Mr 25	Ap 4
253·4	260·2	267·3	274·5	281·7	289·1	296·5	304·0	311·5	**1780**	319·0	326·4	333·9	341·3	348·7	356·0	8·2	10·5	17·6	24·7
158·1	172·4	188·9	206·2	223·6	240·0	253·5	262·2	262·0		254·8	251·8	258·5	271·7	287·8	305·7	323·8	341·7	358·1	11·6
168·0	170·1	172·4	174·3	176·5	178·2	180·1	181·8	183·1		184·4	185·3	185·9	186·3	186·3	186·0	185·5	184·4	183·4	182·1
169·5	181·9	194·5	207·1	219·6	232·1	244·8	257·4	270·1		282·7	295·2	307·6	320·1	332·5	344·7	357·0	8·5	21·0	33·0
213·2	214·3	215·4	216·6	217·8	219·1	220·3	221·4	222·5		223·5	224·4	225·2	226·1	226·5	226·9	227·2	227·3	227·3	227·0
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
146·7	153·1	159·2	165·5	171·7	176·9	184·0	190·1	196·1	**1781**	202·4	208·3	214·4	220·7	226·2	232·0	237·7	243·1	248·5	254·0
168·3	184·7	203·1	219·8	234·5	244·7	247·0	240·8	235·7		240·3	251·6	267·5	284·1	302·2	320·4	336·6	350·5	358·5	357·4
191·3	193·7	195·9	197·9	200·2	202·4	204·4	206·6	208·5		210·3	211·9	213·4	214·6	215·5	216·2	216·6	216·3	216·5	215·9
128·0	137·1	147·5	157·6	169·1	180·0	191·6	203·6	215·5		227·5	239·9	252·3	264·6	276·9	289·8	301·7	314·2	326·6	339·0
223·1	224·2	225·2	226·2	227·4	228·6	229·7	230·8	232·0		233·1	234·1	235·1	236·1	236·7	237·3	238·0	238·1	238·8	238·3
282·0	287·3	293·2	299·2	305·6	312·0	318·4	325·2	332·0	**1782**	338·6	345·6	352·4	359·2	6·0	12·7	19·3	26·2	32·8	39·5
182·4	199·5	214·8	226·7	231·7	227·6	220·7	224·0	232·1		246·5	263·2	281·0	298·6	315·4	329·7	339·2	339·9	333·0	330·3
215·7	217·5	219·7	222·0	224·1	226·2	228·6	230·8	232·9		235·3	237·3	239·2	241·1	242·9	244·4	245·7	246·7	247·4	248·1
206·4	218·5	230·6	242·7	254·4	266·1	277·8	289·3	300·8		311·0	320·8	329·9	327·5	343·4	346·4	345·8	342·5	337·8	333·4
233·8	234·2	235·1	236·1	237·3	238·4	239·6	240·7	241·8		243·0	244·0	245·0	246·1	246·9	247·7	248·5	248·8	248·9	249·4
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
158·9	165·3	171·8	178·2	184·6	191·2	197·6	204·1	210·7	**1783**	217·1	223·9	230·5	237·2	243·8	250·8	257·3	264·0	270·8	277·6
195·0	208·3	215·6	213·9	206·4	204·6	213·0	226·4	242·5		259·8	277·3	294·2	309·4	320·1	322·9	316·9	312·0	316·7	329·2
241·8	243·3	245·1	247·2	249·1	251·3	253·5	255·8	258·1		260·4	262·6	265·0	267·2	269·3	271·4	273·4	275·3	276·9	278·3
151·5	163·6	176·4	188·4	201·0	213·5	226·2	238·9	251·5		264·2	276·7	289·4	301·9	314·6	327·0	339·5	351·9	4·3	16·7
243·4	244·4	245·2	246·9	247·2	248·2	249·3	250·6	251·8		252·9	254·0	255·1	256·2	257·0	257·9	258·8	259·3	259·7	260·3
																Mr 5	Mr 15	Mr 25	Ap 4
341·6	339·7	339·5	340·5	342·7	345·6	349·2	353·3	357·8	**1784**	2·7	8·0	13·4	19·0	24·8	30·4	36·5	42·5	48·4	54·5
198·6	199·6	192·6	188·7	194·6	206·6	221·8	239·1	256·5		273·7	289·0	300·9	305·8	300·9	294·6	297·5	308·2	323·6	341·2
271·2	272·1	273·8	274·4	276·1	277·8	279·8	281·9	284·0		286·3	288·6	290·9	293·2	295·7	298·0	300·5	302·7	304·9	306·7
193·5	189·9	184·7	181·4	181·0	184·1	190·2	198·2	206·8		217·3	227·8	238·8	250·1	261·8	273·5	285·6	297·6	309·5	321·7
253·9	254·6	255·3	256·1	257·1	258·1	259·1	260·3	261·4		262·6	263·8	265·1	266·2	267·1	268·1	269·1	269·7	270·5	271·0
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
171·0	177·6	184·3	190·9	197·6	204·4	211·1	217·9	225·2	**1785**	231·8	238·9	246·0	253·1	260·4	267·6	275·0	282·4	289·7	297·2
178·7	172·9	176·3	187·1	201·9	218·7	235·9	253·0	268·9		281·8	288·7	286·2	279·0	278·9	287·7	302·0	319·2	337·5	356·0
306·1	305·7	305·7	306·0	306·7	309·5	308·7	310·3	311·9		313·8	315·9	318·1	320·3	322·8	325·1	327·5	329·9	332·2	334·7
188·7	201·1	213·6	226·0	238·5	250·8	263·3	275·7	288·1		300·3	312·4	324·4	336·2	347·8	359·1	10·1	20·6	30·7	39·4
264·7	265·2	265·8	266·3	267·3	268·1	269·1	270·3	271·5		272·6	273·8	275·0	276·1	277·2	278·3	279·4	280·2	281·1	281·9
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
50·9	52·2	52·5	51·5	49·1	46·0	43·0	40·6	39·0	**1786**	38·8	39·7	41·5	44·3	47·6	51·6	55·7	60·5	65·5	70·5
158·1	167·4	181·9	198·1	215·4	232·7	248·9	262·7	271·4		271·1	263·9	261·8	267·9	281·3	297·5	315·5	333·8	351·5	8·4
346·3	345·0	343·9	342·8	342·3	342·0	342·0	342·4	343·2		344·1	345·6	347·2	348·8	350·8	352·9	355·1	357·5	359·9	2·2
135·2	147·0	158·9	170·9	183·2	195·5	207·7	220·3	233·5		245·4	258·2	270·8	282·9	295·8	308·5	321·0	333·4	345·9	358·4
275·9	276·2	276·6	276·9	277·7	278·6	279·4	280·5	281·6		282·7	283·9	285·1	286·2	287·4	288·7	289·8	290·7	291·6	292·6
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
183·5	190·2	197·0	204·0	210·9	217·9	224·9	232·1	239·4	**1787**	246·8	254·0	261·4	269·0	276·6	284·2	292·0	299·6	307·5	315·2
161·5	177·6	194·9	212·3	228·8	243·4	253·8	256·0	249·8		245·0	249·3	261·0	276·3	293·7	311·9	329·8	346·7	0·7	9·2
27·8	26·7	25·1	23·6	22·9	20·9	19·8	19·0	18·4		18·3	18·5	19·1	19·8	21·0	22·5	24·1	25·9	27·9	30·0
219·2	229·9	239·9	249·2	257·5	264·2	268·6	270·0	267·2		262·4	258·0	255·9	258·1	263·9	270·5	278·5	288·1	298·2	308·9
287·4	287·6	287·7	287·8	288·5	289·2	289·8	290·8	291·8		292·9	294·1	295·3	296·4	297·6	298·8	300·1	301·2	302·3	303·3
																Mr 5	Mr 15	Mr 25	Ap. 4
81·6	86·1	90·1	93·6	96·1	97·7	98·2	97·2	95·2	**1788**	92·1	88·3	84·7	81·8	80·0	79·8	80·9	82·9	85·8	89·4
173·5	191·1	208·8	223·9	236·0	240·4	236·9	229·8	231·1		241·3	255·7	272·4	290·2	308·1	325·2	339·7	349·7	350·6	343·9
64·2	64·3	63·4	63·1	62·1	61·0	59·6	58·2	57·0		55·8	54·7	54·1	53·6	53·6	54·0	54·6	55·5	56·8	58·2
170·2	182·6	195·2	207·8	220·3	232·8	245·5	258·1	270·7		283·3	295·8	308·3	320·7	333·1	345·4	357·6	8·9	21·5	33·5
299·7	299·6	299·4	299·4	299·9	300·3	300·8	301·7	302·6		303·4	304·6	305·8	306·9	308·1	309·4	310·6	311·9	313·1	314·2
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
196·7	203·6	210·6	217·7	224·9	232·0	239·4	246·8	254·3	**1789**	261·9	269·5	277·2	285·1	292·7	300·8	308·4	316·3	324·3	332·2
188·3	204·3	217·5	224·5	228·1	215·3	214·0	221·4	235·6		251·7	269·5	286·8	304·0	318·1	330·0	333·2	327·1	322·2	326·7
95·7	96·6	97·5	97·8	98·0	97·6	97·1	96·2	95·0		93·8	92·5	91·2	89·9	88·8	87·9	87·4	87·2	87·3	87·8
127·8	137·1	147·9	157·9	169·7	180·4	192·1	204·1	216·1		228·1	240·5	252·9	265·3	277·6	290·0	302·4	314·9	327·3	339·7
312·3	312·1	311·9	311·5	311·7	311·9	312·3	313·1	313·8		314·5	315·6	316·7	317·8	319·0	320·2	321·5	322·8	324·0	325·3
100·6	106·2	111·3	116·1	120·6	124·5	128·1	130·5	132·0	**1790**	132·5	131·9	130·0	126·8	123·4	119·0	115·9	113·8	113·1	113·4
198·5	207·7	208·7	201·2	197·7	203·3	215·8	231·4	248·4		265·8	283·0	298·6	310·6	315·6	311·3	304·9	307·2	318·5	333·7
122·8	124·6	126·1	127·4	128·4	129·2	129·7	129·8	129·5		129·2	128·3	127·2	126·0	124·8	123·4	122·1	121·0	120·2	119·5
207·1	219·1	231·3	243·3	255·0	266·5	278·2	289·7	300·6		311·1	320·7	329·5	336·6	341·9	344·0	342·2	338·1	333·3	329·7
325·7	325·2	324·7	324·2	324·3	324·3	324·3	324·9	325·4		326·1	327·1	328·1	329·1	330·4	331·5	332·7	334·0	335·3	336·6

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Śrav.	Dan.	Satab	P. Bhad.	U. Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle.

Venus, A.D. 1765—A.D. 1999;

Year	Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ...	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1790	Mars ...	114.3	115.4	119.3	123.0	127.1	131.7	136.6	141.9	147.4	153.1	158.9	164.8	171.2	177.4	183.9	190.5	197.2	204.1
	Merc. ...	342.9	1.1	20.0	38.7	55.9	70.1	77.7	76.4	69.2	63.2	78.8	93.1	110.0	126.7	146.4	163.5	178.8	190.0
	Jup. ...	119.2	119.2	119.3	119.9	120.8	121.9	123.2	124.8	126.5	128.4	130.3	132.3	134.5	136.8	138.9	141.3	143.5	145.5
	Ven. ...	330.8	332.8	337.5	344.5	353.2	2.5	11.8	22.9	33.8	45.0	56.3	68.1	79.8	91.3	103.2	115.4	127.6	139.6
	Sat. ...	337.2	338.4	339.5	340.7	341.6	342.4	343.3	343.8	344.2	344.6	344.4	344.2	344.1	343.4	342.8	342.2	341.4	340.6
1791	Mars ...	352.4	0.0	7.6	15.1	22.5	29.8	37.1	44.3	51.2	58.3	65.0	71.7	78.3	84.9	91.4	97.7	103.9	110.0
	Merc. ...	357.4	15.5	33.3	48.3	57.8	58.5	51.5	49.2	57.4	71.4	88.1	106.2	124.6	142.4	158.4	171.3	177.4	174.0
	Jup. ..	152.2	151.2	150.3	149.9	149.7	149.8	150.4	151.1	152.1	153.4	155.1	156.8	158.5	160.6	162.5	164.7	166.8	169.0
	Ven. ...	23.6	35.8	47.9	59.9	72.0	83.7	95.3	107.0	118.3	129.3	140.3	150.4	160.5	170.2	178.6	185.6	191.0	192.2
	Sat. ...	348.8	350.1	351.3	352.5	353.6	354.7	355.7	356.4	357.0	357.7	357.7	357.9	358.0	357.6	357.2	356.6	355.8	355.0
	Eng. date ...	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1792	Mars ...	146.8	145.6	145.7	146.8	149.2	152.0	155.7	160.1	164.7	169.9	175.4	181.1	187.0	193.2	199.6	206.2	212.9	220.0
	Merc. ...	11.1	26.7	37.5	39.7	33.3	29.7	36.0	49.3	65.7	83.3	102.4	120.7	137.6	151.7	159.5	159.2	151.6	150.1
	Jup. ...	186.1	184.8	183.5	182.4	181.4	180.5	180.0	179.8	179.8	180.4	181.3	182.1	183.5	185.0	186.7	188.4	190.5	192.0
	Ven. ...	328.6	340.8	353.1	5.3	17.4	29.6	41.7	54.2	66.3	78.4	90.5	103.0	114.5	127.5	139.9	152.3	164.7	177.0
	Sat. ...	0.5	1.8	3.1	4.4	5.6	6.8	8.0	8.8	9.7	10.6	10.9	11.3	11.8	11.6	11.3	11.1	10.5	9.8
1793	Mars ...	7.8	15.2	22.6	29.7	37.0	44.2	51.1	58.1	65.1	71.7	78.4	85.0	91.6	98.1	104.5	110.9	117.1	123.3
	Merc. ...	16.5	21.1	15.7	10.3	14.4	27.0	43.0	61.2	80.2	98.6	116.1	131.2	141.6	143.2	136.6	132.4	138.1	150.7
	Jup. ..	220.1	219.2	218.0	216.7	215.6	214.3	212.9	211.8	211.0	210.6	210.3	210.5	210.8	211.5	212.7	213.8	215.4	217.0
	Ven. ...	43.7	50.2	54.8	55.4	52.3	46.7	41.5	39.1	36.4	45.1	51.7	60.2	69.6	79.4	89.9	101.0	112.2	123.3
	Sat. ..	12.5	13.8	15.1	16.5	17.2	19.1	20.4	21.5	22.5	23.6	24.2	24.9	25.5	25.7	25.7	25.7	25.3	24.9
	Eng. date ...	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1794	Mars .	197.1	194.1	190.4	187.7	185.5	184.8	185.3	187.0	189.7	193.3	197.3	202.0	207.4	212.9	218.9	225.1	231.5	238.2
	Merc.	358.3	351.6	353.9	5.1	20.5	38.4	56.9	75.7	93.6	110.1	121.5	125.8	120.8	115.1	118.1	130.3	145.5	162.5
	Jup. ...	252.6	252.8	252.4	252.0	251.0	250.0	248.7	247.4	246.0	244.8	243.7	242.8	242.2	242.0	242.0	242.5	243.3	244.3
	Ven. ...	5.5	17.9	30.2	42.6	54.8	66.9	79.2	91.2	103.3	115.2	127.2	139.2	151.0	162.8	174.4	186.1	197.5	208.6
	Sat. ...	24.9	26.2	27.5	28.7	30.1	31.5	32.9	34.1	35.3	36.5	37.4	38.2	39.0	39.4	39.8	40.2	39.9	39.8
1795	Mars ...	22.7	29.8	36.9	43.9	50.8	57.7	64.5	71.2	77.9	84.4	91.2	97.5	104.0	110.5	116.9	123.2	129.5	135.8
	Merc. ...	334.3	343.3	358.0	15.8	34.4	53.5	72.0	88.6	101.7	107.9	104.3	97.9	99.2	109.8	124.4	141.5	159.3	176.9
	Jup. ...	283.0	284.3	285.4	285.8	286.1	286.1	285.6	284.9	284.0	282.7	281.5	280.1	278.8	277.5	276.6	275.9	275.4	275.5
	Ven. ..	315.1	326.3	337.7	349.2	1.2	12.9	24.8	36.7	48.7	60.8	72.6	84.9	96.9	109.1	121.3	133.8	146.2	158.4
	Sat. ...	37.4	38.7	40.0	41.4	42.7	44.0	45.4	46.7	48.0	49.2	50.3	51.4	52.5	53.1	53.7	54.3	54.4	54.3
	Eng. date ...	Ap 9	Ap 19	Ap 29	My 9	My 19	My 29	Je 8	Je 18	Je 28	Jl 8	Jl 18	Jl 28	Au 7	Au 17	Au 27	S 6	S 16	S 26
1796	Mars ...	243.5	246.6	248.7	249.9	250.5	249.7	247.5	245.2	242.7	240.7	239.7	239.8	241.8	244.4	248.2	252.5	257.7	263.1
	Merc. ...	335.3	353.1	11.4	30.3	49.0	67.2	80.5	88.9	87.4	80.2	79.8	88.8	102.6	120.0	137.9	155.7	172.7	188.1
	Jup. ...	311.8	313.8	315.6	317.3	318.7	319.8	320.7	321.2	321.4	321.1	320.5	319.7	318.7	317.4	316.0	314.7	313.3	312.2
	Ven. ...	40.0	51.4	62.8	73.4	83.9	93.7	102.8	110.6	117.1	120.8	120.8	117.3	111.5	106.5	104.6	106.7	111.8	118.9
	Sat. ...	50.3	51.6	52.8	53.9	55.2	56.5	57.7	59.2	60.6	62.0	63.2	64.4	65.6	66.4	67.3	68.1	68.5	69.2
1797	Mars ...	37.3	44.0	50.8	57.5	64.2	70.8	77.3	83.9	90.3	96.9	103.3	109.6	116.1	122.4	128.9	135.1	141.5	147.9
	Merc. ..	348.8	7.6	26.3	43.7	59.0	68.9	69.7	62.8	60.2	67.8	81.4	98.1	116.0	134.3	152.0	167.4	180.7	186.6
	Jup. ...	339.9	342.2	344.5	346.7	348.8	350.7	352.4	354.1	355.4	356.4	357.1	357.5	357.7	357.3	356.7	355.8	354.6	353.2
	Ven. ...	346.1	359.3	11.8	23.9	36.4	48.7	61.0	73.0	85.3	97.7	109.9	122.0	134.1	146.4	159.0	171.2	183.4	195.6
	Sat.	63.5	64.5	65.6	66.6	67.9	69.2	70.4	71.8	73.1	74.4	75.7	77.0	78.3	79.4	80.5	81.5	82.1	82.7
	Eng. date ...	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1798	Mars ...	272.4	278.3	284.4	290.3	295.8	301.3	306.0	310.5	314.3	317.4	319.6	320.1	319.3	317.9	315.4	313.2	311.7	311.2
	Merc. ...	5.6	21.4	37.1	48.2	51.1	44.6	40.7	46.5	59.5	75.8	93.9	112.5	130.6	147.3	161.4	169.5	168.8	161.6
	Jup. ...	7.6	10.0	12.4	14.7	17.1	19.5	21.7	23.8	25.8	27.7	29.5	31.0	32.1	33.1	33.7	33.8	33.8	33.5
	Ven. ...	328.0	331.0	336.4	344.0	353.0	2.5	11.7	23.1	34.1	45.4	56.8	68.6	80.2	91.8	103.8	116.0	128.2	140.3
	Sat. ...	77.0	77.8	78.6	79.5	80.6	81.8	83.0	84.3	85.6	86.9	88.3	89.6	91.1	92.2	93.3	94.5	95.4	96.2
1799	Mars ...	62.0	58.4	64.7	71.1	77.2	83.7	90.0	96.1	102.6	108.9	115.2	121.6	127.8	134.6	140.7	147.0	153.4	159.7
	Merc.	14.9	27.3	31.8	26.5	21.3	25.5	37.4	53.4	71.5	90.2	108.7	126.1	141.2	151.0	152.8	146.0	142.1	148.0
	Jup. .	34.9	37.2	39.5	41.8	44.4	46.6	49.0	51.2	53.5	55.9	58.0	60.1	62.0	63.7	65.3	66.7	67.7	68.5
	Ven.	24.2	36.4	48.5	60.5	72.6	84.3	95.8	107.5	118.7	129.7	140.6	150.7	160.7	170.0	178.2	184.8	189.7	189.9
	Sat. ..	90.6	91.1	91.7	92.3	93.4	94.4	95.4	96.1	97.9	99.1	100.5	101.9	103.2	104.4	105.1	106.9	107.9	109.0
1800	Mars	293.5	300.8	308.0	315.3	322.4	329.4	336.5	343.2	350.0	356.8	2.4	8.2	13.5	18.5	22.6	26.1	28.5	29.7
	Merc. ...	12.6	9.6	2.8	4.7	15.6	30.9	48.9	67.6	86.6	103.9	120.2	132.3	136.0	131.0	125.2	128.7	140.1	155.0
	Jup.	64.0	64.6	66.5	68.4	70.5	72.6	75.0	77.2	79.6	81.9	84.2	86.5	88.6	90.9	92.9	94.8	96.6	98.2
	Ven. ..	329.3	341.4	353.7	6.0	18.1	30.3	42.4	54.9	67.0	79.1	91.2	103.7	115.0	128.2	140.6	153.1	165.5	177.7
	Sat. ...	104.4	104.6	104.9	105.3	106.1	107.0	107.7	108.8	110.0	111.6	112.5	113.8	115.0	116.3	117.6	119.9	120.0	121.1
	Eng. date	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1801	Mars .	67.1	72.8	78.6	84.5	90.6	96.6	102.7	108.8	114.9	120.9	127.3	133.5	139.9	146.1	152.6	159.1	165.4	172.1
	Merc. ...	345.0	344.5	353.5	8.4	25.8	44.7	63.7	82.0	98.8	112.1	118.4	115.2	108.2	109.8	119.7	134.2	151.0	168.7
	Jup. ...	92.4	93.2	94.2	95.5	97.1	98.8	100.8	102.8	104.9	107.0	109.3	111.4	113.7	115.9	118.1	120.3	123.4	124.6
	Ven. .	43.3	49.5	53.1	53.2	49.0	42.8	37.7	36.2	33.6	41.1	51.2	59.9	69.6	79.6	90.2	101.4	112.6	124.2
	Sat. ...	118.3	118.2	118.2	118.3	119.0	119.6	120.1	121.1	122.1	123.1	124.3	125.6	126.9	128.2	129.5	130.7	131.9	133.1

Mesh.	Vrsh.	Mith.	Kat.	Sim.	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13.3	26.7	40.0	53.3	66.7	80.0	93.3	106.7	120.0

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
211·0	217·8	225·0	232·3	239·6	247·2	254·6	262·3	269·9	**1791**	277·7	285·6	293·8	301·2	309·2	317·0	324·9	332·8	340·6	348·5
198·5	188·0	182·1	185·3	196·5	211·2	227·5	245·2	262·3		278·3	291·3	298·1	295·8	288·5	288·3	297·7	311·0	329·2	347·6
147·8	149·8	151·8	153·6	155·2	156·6	157·9	159·1	159·7		160·3	160·4	160·2	159·7	158·8	157·8	156·6	155·4	154·0	152·7
152·2	164·3	177·2	189·0	201·6	214·1	226·8	239·6	252·2		264·9	277·4	290·1	302·6	315·3	327·7	340·1	352·6	4·9	17·3
339·7	339·0	338·4	337·7	337·4	337·2	337·1	337·4	337·8		338·2	339·0	339·9	340·7	341·8	343·0	344·2	345·5	346·8	348·0
																Mr 5	Mr 15	Mr 25	Ap 4
116·0	121·8	127·5	133·0	138·3	143·3	148·0	152·4	156·3	**1792**	159·6	162·3	164·0	164·6	163·8	161·7	158·5	154·7	150·9	147·8
166·9	167·2	177·0	190·9	207·2	224·6	241·7	258·2	271·9		280·5	280·7	273·2	270·7	277·8	291·0	307·3	325·3	343·8	1·9
171·1	173·3	175·5	177·7	179·8	181·6	183·6	185·2	186·7		188·0	189·1	189·8	190·3	190·5	190·3	189·8	189·1	188·0	186·8
190·2	185·8	180·6	178·2	178·8	182·8	189·4	197·9	206·8		217·3	228·0	239·1	250·4	262·2	274·0	286·1	298·1	310·0	322·3
354·2	353·4	350·6	351·8	351·4	350·9	350·6	250·6	350·8		350·9	351·5	352·2	352·8	353·9	355·0	356·0	357·2	358·5	359·8
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
226·7	233·7	241·0	248·4	255·8	263·5	271·1	278·6	286·5	**1793**	294·3	302·1	310·0	317·7	325·6	333·3	341·0	348·7	356·3	8·8
157·5	170·9	187·0	204·1	221·6	237·9	252·6	263·0	265·2		259·0	254·1	258·6	270·4	285·9	303·3	321·6	339·6	356·8	11·2
194·7	196·8	199·1	201·2	203·3	205·7	207·8	209·9	211·7		213·7	215·3	216·9	218·4	219·4	220·2	220·7	220·9	221·0	220·3
189·5	201·8	214·3	226·7	239·2	251·5	263·9	276·4	288·7		300·9	313·0	325·0	336·7	348·3	359·5	10·4	20·8	30·7	39·1
9·1	8·3	7·5	6·6	6·0	5·3	4·7	4·6	4·4		4·2	4·6	5·1	5·5	6·4	7·3	8·1	9·3	10·6	11·8
129·4	135·5	141·4	147·3	153·0	158·8	164·1	169·5	174·8	**1794**	179·6	184·4	188·7	192·6	195·9	198·4	200·4	200·9	200·6	198·7
166·6	183·4	201·0	217·8	233·8	244·9	249·6	245·4	238·6		240·3	250·7	265·7	282·9	299·9	317·9	335·0	349·9	0·2	1·5
219·0	220·9	228·1	225·1	227·4	229·6	231·8	234·2	236·3		238·5	240·7	242·7	244·6	246·5	248·2	249·5	250·7	251·4	252·4
135·8	147·6	159·6	171·5	183·8	196·1	208·3	220·9	234·1		246·1	258·9	271·5	283·6	296·4	309·2	321·7	334·1	346·6	359·1
21·4	23·6	24·5	22·0	21·2	20·5	19·6	19·1	18·7		18·3	18·4	18·6	18·7	19·4	20·2	20·9	22·0	23·1	24·2
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
245·0	252·0	259·2	266·5	274·0	281·4	289·1	296·7	304·3	**1795**	311·9	319·9	327·1	334·7	342·2	349·6	357·1	4·4	11·6	18·9
179·6	197·5	213·4	226·4	231·7	232·0	224·6	222·9	230·9		244·9	261·1	278·8	296·5	313·7	328·9	340·0	343·6	337·7	332·7
245·6	247·1	248·7	250·7	252·6	254·7	257·0	259·2	261·5		263·9	266·1	268·4	270·7	273·0	275·0	277·2	279·1	280·8	282·3
219·5	230·0	239·8	248·9	256·9	263·1	266·8	267·2	263·3		258·0	253·9	253·1	256·2	261·8	270·1	278·3	288·0	298·4	309·1
39·5	38·9	38·2	37·4	36·6	35·8	34·9	34·3	33·7		33·0	32·8	32·7	32·6	33·1	33·5	33·9	34·9	35·8	36·8
																Mr 5	Mr 15	Mr 25	Ap 4
142·1	148·2	154·5	160·5	166·5	172·6	178·7	184·6	190·5	**1796**	196·4	202·2	207·7	213·2	218·7	223·8	228·9	233·5	237·8	241·7
193·6	207·7	217·0	217·5	210·5	206·4	212·7	225·0	240·5		257·8	275·3	292·6	308·2	320·4	325·8	321·3	315·2	317·3	328·3
275·8	276·3	277·4	278·5	280·1	281·8	283·6	285·6	287·7		290·0	292·4	294·6	296·8	299·4	301·6	304·0	306·3	308·7	310·8
170·9	183·3	195·9	208·5	221·0	233·5	246·2	258·8	271·1		284·0	296·5	309·0	321·4	333·7	346·0	358·2	9·3	22·0	34·0
54·1	54·0	53·5	53·0	52·2	51·4	50·5	49·8	49·0		48·2	47·9	47·5	47·0	47·2	47·4	47·6	48·3	49·0	49·7
O 6	O 16	O 26	N 5	N 15	N 25	D 5	D 15	D 25		Ja 4	Ja 14	Ja 24	F 3	F 13	F 23	Mr 5	Mr 15	Mr 25	Ap 4
269·0	275·3	281·7	288·5	295·1	302·2	309·3	316·3	323·5	**1797**	330·6	337·8	345·0	352·1	359·0	6·1	13·0	20·0	26·9	33·8
199·2	202·6	196·9	191·4	194·5	205·4	220·0	236·9	254·1		271·7	287·7	300·9	307·8	305·5	298·4	298·4	307·4	322·0	339·1
311·4	310·8	310·6	310·8	311·2	311·9	313·0	314·4	315·9		317·5	319·7	321·9	324·2	326·5	328·7	331·2	333·6	336·0	338·5
127·6	137·0	148·2	158·2	170·3	180·8	192·6	204·6	216·7		228·7	241·1	253·6	265·2	278·2	290·7	303·0	315·5	328·0	340·3
69·2	69·0	68·7	68·6	67·9	67·2	66·5	65·6	64·8		63·9	63·3	62·6	61·9	61·8	61·7	61·6	62·1	62·5	63·0
154·2	160·6	167·0	173·2	179·7	186·6	192·8	198·7	205·7	**1798**	211·4	218·0	224·3	230·7	237·2	243·6	249·9	256·4	262·7	269·0
184·9	176·1	176·6	186·2	200·1	216·5	233·8	251·2	267·9		281·3	290·2	290·1	283·0	279·7	287·4	300·0	317·1	335·2	353·8
352·0	350·5	348·8	348·2	347·4	346·9	346·9	347·1	347·8		348·7	349·8	351·3	353·0	354·9	356·9	359·2	1·5	3·6	5·2
207·8	219·8	231·9	243·9	255·5	267·1	278·6	290·1	300·8		311·2	320·6	329·1	335·7	340·3	341·5	338·7	338·7	328·8	326·0
83·4	83·4	83·4	83·1	82·9	82·5	82·0	81·1	80·3		79·5	78·7	78·0	77·2	76·8	76·4	76·0	76·2	76·4	76·5
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
312·0	314·0	317·3	320·9	325·4	330·3	335·3	341·0	346·5	**1799**	352·6	358·6	4·7	10·9	17·1	23·3	29·6	35·9	42·4	48·7
159·2	166·8	180·2	196·1	218·2	230·6	247·2	261·9	272·2		274·5	268·2	263·5	267·9	279·9	295·6	313·3	331·6	349·8	6·8
32·7	31·6	30·5	29·1	27·7	26·4	25·2	24·3	23·6		23·3	23·2	23·7	24·4	25·3	26·7	28·2	29·9	31·8	33·9
152·8	161·9	178·0	189·7	202·3	214·8	227·5	240·3	252·9		265·6	278·1	290·7	303·3	315·9	328·3	340·7	353·2	5·6	17·9
97·0	97·3	97·5	97·9	97·7	97·4	97·2	96·5	95·7		95·0	94·2	93·3	92·5	91·9	91·3	90·6	90·6	90·5	90·4
166·3	172·8	179·3	186·0	192·5	199·3	205·8	212·6	219·3	**1800***	226·2	233·1	240·1	247·0	254·1	261·0	268·2	275·4	282·6	289·9
160·1	175·6	192·7	210·2	227·0	242·3	254·0	258·7	254·2		247·7	249·8	260·9	274·6	291·6	309·6	327·9	344·9	0·1	10·6
69·0	69·0	68·8	68·4	67·5	65·3	64·9	63·7	62·3		61·0	59·9	59·7	58·6	58·3	58·5	58·9	59·8	60·9	62·2
187·0	181·7	176·6	175·0	176·6	181·5	188·7	197·6	206·8		217·4	228·1	239·5	250·8	262·6	274·5	286·6	298·7	310·6	322·9
110·0	110·5	111·1	111·6	111·7	111·7	111·7	111·2	110·6		110·0	109·2	108·4	107·7	106·9	106·1	105·3	105·0	104·7	104·3
29·6	28·2	25·9	23·1	21·0	19·4	18·3	18·6	20·3	**1801**	22·6	25·5	29·1	33·2	37·8	42·7	47·8	53·1	58·5	64·0
171·5	189·0	206·9	222·6	235·7	242·5	240·9	233·3	231·9		240·8	254·1	270·5	288·1	306·0	323·4	339·0	350·5	353·9	348·5
99·3	100·8	101·7	102·1	102·3	102·4	101·8	101·2	100·2		98·9	97·5	96·2	94·9	93·8	92·9	92·1	91·8	91·6	92·1
190·2	202·5	215·0	227·4	239·8	252·2	264·6	277·1	289·3		301·5	313·6	325·6	337·2	348·8	359·8	10·8	21·1	30·7	38·7
122·8	123·1	123·9	124·7	125·0	125·2	125·5	125·3	125·0		124·7	124·0	123·3	122·5	121·8	121·0	120·2	119·6	119·0	118·4
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
178·7	185·4	192·0	198·8	205·6	212·6	219·4	226·5	233·6	**1802**	240·8	248·2	255·5	262·8	270·2	277·9	285·4	293·0	300·6	308·4
186·3	202·9	216·8	225·8	226·6	219·4	215·8	221·6	234·0		249·8	267·0	285·0	302·0	318·0	330·3	335·8	332·1	325·5	327·4
126·5	128·1	129·8	131·1	132·3	133·1	133·9	134·2	133·9		133·7	133·0	132·0	130·7	129·5	[illegible]	126·9	125·7	124·6	123·8
136·3	148·1	160·3	172·1	184·5	196·7	209·0	221·6	235·2		246·8	259·5	272·2	284·8	297·1	309·8	322·4	334·7	347·3	359·7
134·3	135·3	136·2	137·3	137·7	138·3	138·8	138·7	138·7		138·5	138·0	137·4	136·9	136·1	135·3	134·5	133·8	133·1	132·4

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Śrav.	Dan.	Satab.	P. Bhad.	U. Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

* The year A.D 1800 was not a leap year except in Russia

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle.
Venus, A.D. 1765—A.D. 1999;

Day of I S Y		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng date	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	A 9	A 19	A 29	S 8	S 18	S 28
1802	Mars	312·8	319·9	327·6	335·3	342·8	350·4	357·7	5·1	12·3	19·4	26·1	33·0	39·3	45·6	51·7	57·2	62·2	67·3
	Merc.	332·8	346·2	8·2	21·7	40·7	59·5	76·7	91·0	99·5	98·2	91·1	90·0	99·1	113·0	129·8	147·4	165·8	182·5
	Jup	123·6	123·4	123·5	123·8	124·5	125·5	126·9	128·2	129·9	131·7	133·7	135·7	137·9	140·1	142·1	144·4	146·6	148·9
	Ven.	6·2	[illegible]	30·9	43·3	55·5	67·6	79·9	91·8	103·9	115·9	127·8	139·8	151·5	163·8	174·9	186·6	197·9	208·9
	Sat.	132·1	131·8	131·8	131·4	131·8	132·1	132·5	133·3	134·1	134·9	136·1	137·2	138·4	139·7	140·9	142·2	143·4	144·7
1803	Mars	83·5	88·8	93·7	99·1	104·4	110·0	115·9	121·7	127·7	133·7	139·7	146·1	152·2	158·6	165·0	171·6	178·1	184·8
	Merc	340·9	359·0	17·9	36·5	54·4	69·5	79·4	80·5	73·6	70·9	78·7	91·6	108·1	125·5	144·2	161·5	177·5	190·0
	Jup.	156·8	155·8	154·9	154·1	154·0	154·2	154·2	154·9	155·9	157·0	158·4	160·0	162·0	163·9	165·7	167·8	170·1	172·2
	Ven	315·4	326·7	338·1	349·7	1·7	13·5	25·4	37·3	49·3	61·4	73·2	85·6	97·6	109·8	122·0	134·4	146·9	159·1
	Sat.	145·8	145·3	144·8	144·5	144·6	144	144·7	145·3	146·0	146·6	147·6	148·6	149·6	150·8	152·0	153·2	154·5	155·8
	Eng. date	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	A 8	A 18	A 28	S 7	S 17	S 27
1804	Mars	329·6	337·5	345·3	353·0	0·5	8·1	15·4	22·8	30·1	37·2	44·1	51·0	57·5	64·2	70·5	76·7	82·7	88·5
	Merc	355·2	13·8	31·8	47·5	59·0	62·1	56·2	51·7	57·1	69·9	86·1	104·1	122·4	140·6	156·9	170·9	179·0	178·2
	Jup	190·9	189·5	188·1	187·1	185·9	185·0	184·2	184·1	184·0	184·3	185·0	185·9	187·1	188·4	190·1	191·9	193·8	195·7
	Ven	40·5	51·9	63·2	73·7	84·1	93·8	102·7	110·1	116·2	119·3	118·8	113·9	107·5	102·8	101·8	105·0	110·7	118·4
	Sat	159·3	158·6	158·0	157·4	157·2	157·1	157·0	157·3	157·7	158·1	159·0	159·8	160·6	161·7	162·8	163·9	165·2	166·4
	Eng date	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1805	Mars	104·5	107·4	111·3	115·5	120·1	125·1	130·5	135·9	141·4	147·2	153·3	159·2	165·6	171·8	178·4	184·8	191·5	198·4
	Merc	9·3	25·6	38·0	43·5	38·5	32·7	36·8	47·9	63·8	81·8	100·4	118·7	136·0	150·9	161·1	162·8	156·1	151·9
	Jup	224·7	223·8	222·8	221·5	220·3	218·9	217·7	216·5	215·7	214·9	214·6	214·6	215·0	215·5	216·4	217·6	219.1	220·8
	Ven	346·6	0·0	12·4	24·6	37·2	49·3	61·8	73·7	86·0	98·4	110·5	122·7	134·8	147·0	159·8	172·0	184·1	196·3
	Sat	172·4	171·7	171·0	170·3	169·9	169·5	169·2	169·3	169·5	169·6	170·3	170·9	171·6	172·8	173·7	174·7	175·9	177·1
1806	Mars	346·1	353·9	1·5	9·0	16·6	24·0	31·3	38·5	45·6	52·5	59·5	66·1	72·9	79·3	85·9	92·1	98·3	106·3
	Merc	16·7	23·6	20·5	13·8	15·1	26·0	41·3	59·2	77·8	96·3	114·1	130·2	142·2	143·4	141·1	135·1	133·4	149·8
	Jup	256·9	257·1	257·2	256·7	256·1	255·1	253·9	252·5	251·1	249·9	248·7	247·6	247·0	246·6	246·4	246·8	247·3	248·2
	Ven	325·4	329·2	335·5	343·5	352·7	2·4	11·7	23·4	34·5	45·9	57·3	69·1	80·7	92·4	101·4	116·5	128·8	140·9
	Sat	185·2	184·4	183·6	182·8	182·3	181·8	181·2	181·2	181·2	181·1	181·5	181·9	182·5	183·3	184·2	185·1	186·2	187·4
1807	Mars	132·4	132·8	134·1	136·4	139·5	143·3	147·6	152·3	157·5	162·7	168·5	174·3	180·4	186·7	193·1	199·7	206·5	213·2
	Merc	2·9	355·5	355·2	4·2	19·0	36·3	54·5	73·6	91·8	109·0	121·6	128·6	125·3	118·3	119·7	129·3	144·0	160·7
	Jup.	287·0	288·5	289·5	290·4	290·7	291·0	290·7	290·0	289·2	288·2	286·8	2[illegible]5·5	284·1	282·9	281·8	280·9	280·4	280·0
	Ven	24·9	37·0	49·1	61·1	73·1	84·8	96·4	107·9	119·1	130·1	140·9	151·1	161·0	169·9	177·7	184·0	187·5	187·5
	Sat.	197·7	196·9	196·0	195·3	194·6	194·0	193·3	193·1	192·9	192·5	192·8	193·0	193·3	191·0	194·8	195·5	196·6	197·6
	Eng. date	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1808	Mars	1·7	9·5	16·8	24·2	31·4	38·5	45·7	52·8	59·7	66·5	73·3	79·9	86·5	93·0	99·5	105·8	112·0	118·3
	Merc	335·8	342·8	356·5	13·6	32·2	51·3	69·8	87·2	101·3	109·9	109·1	101·8	100·6	10[illegible]·9	123·0	139·4	157·2	174·8
	Jup.	315·8	317·8	319·6	321·4	322·9	324·1	325·2	325·8	326·1	326·1	325·9	325·2	324·1	323·0	321·6	320·4	318·9	317·7
	Ven	329·8	342·0	354·2	6·6	18·7	30·9	43·1	55·4	67·5	79·9	91·9	104·4	115·9	128·9	141·2	153·6	166·1	178·3
	Sat	204·8	209·1	208·3	207·6	206·8	205·9	205·3	204·9	204·5	204·1	204·1	204·1	204·1	204·7	205·3	205·8	206·7	207·6
	Eng date	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1809	Mars	175·7	172·4	169·9	168·1	168·0	169·2	171·5	174·6	178·3	182·7	187·6	192·8	198·6	204·5	210·6	216·5	223·6	230·5
	Merc	334·9	351·0	9·1	28·0	48·0	64·7	80·0	90·3	91·6	84·6	81·5	88·5	101·6	118·0	135·6	153·6	171·2	187·0
	Jup	343·8	345·1	348·4	350·7	352·8	354·9	356·7	358·4	359·7	1·0	1·9	2·5	2·7	2·5	2·1	1·2	0·2	358·8
	Ven.	42·5	47·9	50·7	49·9	45·4	39·4	31·1	34·6	37·6	43·6	51·0	59·8	69·7	79·9	90·5	101·7	113·0	124·9
	Sat	221·6	220·9	220·3	219·6	218·8	218·0	217·3	216·6	216·0	215·5	215·8	215·8	215·1	215·4	215·8	216·2	217·0	217·9
1810	Mars	15·9	24·1	31·2	38·3	45·3	52·4	59·2	65·0	72·9	79·5	86·3	92·7	99·2	105·6	112·4	118·4	124·7	130·9
	Merc.	346·6	5·2	24·1	42·2	58·2	70·0	73·4	67·5	62·1	68·1	80·0	96·1	113·9	132·1	150·0	166·1	180·8	188·4
	Jup	11·3	13·7	16·1	18·5	20·8	22·2	25·5	27·7	29·7	31·7	33·4	35·1	36·5	37·5	38·3	38·6	39·0	38·6
	Ven.	6·9	19·1	31·5	43·9	56·1	68·2	80·4	92·[illegible]	104·5	116·5	128·4	140·4	152·1	163·7	175·4	186·9	198·2	209·2
	Sat	233·1	232·7	232·3	231·4	230·6	229·8	229·1	228·4	227·7	226·8	226·7	226·3	226·0	226·2	22[illegible]·4	226·6	227·3	227·9
1811	Mars	228·1	228·6	228·0	226·5	223·9	221·1	218·5	216·7	216·3	216·6	218·4	221·4	225·0	229·5	234·4	240·0	245·9	252·0
	Merc	1·4	19·6	35·9	48·5	54·1	50·0	43·7	47·0	58·4	74·0	91·7	110·8	128·5	145·6	161·0	170·7	172·4	165·7
	Jup	38·8	40·9	43·0	45·5	47·7	50·1	52·5	54·8	57·1	59·4	61·8	63·8	65·9	67·7	69·4	70·7	72·0	72·8
	Ven	315·8	327·0	338·5	350·2	2·3	14·1	26·0	37·9	49·8	62·0	73·9	86·2	98·1	110·4	122·7	135·0	147·5	159·7
	Sat.	244·4	244·0	243·7	243·4	242·6	241·9	241·1	240·3	239·5	238·8	238·3	237·8	237·8	237·2	237·2	237·2	237·8	238·3
	Eng. date	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1812	Mars	31·5	38·6	45·3	52·1	58·9	65·7	72·4	78·8	85·3	91·9	98·4	104·9	111·3	117·9	124·1	130·4	136·7	143·1
	Merc.	13·8	27·5	34·3	31·9	21·9	26·2	36·4	51·7	69·4	88·2	106·5	124·4	140·2	151·9	156·0	151·0	144·9	147·9
	Jup.	68·9	68·5	70·3	72·2	74·1	76·2	68·5	80·7	83·1	85·4	87·6	90·0	92·2	94·3	96·[illegible]	98·4	100·4	102·0
	Ven.	40·8	52·2	63·4	73·9	84·1	93·7	102·2	109·3	114·6	116·9	115·3	110·1	104·3	100·5	100·3	104·1	110·1	118·0
	Sat	255·3	255·1	254·9	254·8	254·1	253·5	252·9	252·2	251·4	250·6	250·0	249·3	248·7	248·5	248·3	248·1	248·4	248·8
	Eng. date	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1813	Mars	262·3	267·7	272·7	276·8	281·1	284·9	287·7	291·0	291·2	291·0	289·9	287·0	282·9	282·8	281·6	282·5	284·3	287·1
	Merc.	14·3	14·0	6·8	5·7	14·9	29·3	46·7	65·3	84·2	102·5	119·0	132·2	138·7	135·7	129·4	129·4	139·3	153·2
	Jup.	96·5	97·2	98·1	99·4	100·8	102·6	104·3	106·1	108·4	110·5	112·6	114·7	117·2	119·4	121·7	123·8	125·9	128·1
	Ven.	347·4	0·6	13·0	25·2	37·9	50·0	6[illegible]·3	74·5	80·7	98·9	111·2	123·3	135·4	147·6	160·3	172·5	184·6	196·8
	Sat.	266·3	266·4	266·4	266·4	265·9	265·1	264·9	264·[illegible]	263·3	262·5	261·8	261·1	260·4	260·1	259·7	259·3	259·4	259·6

Mesh.	Vrish	Mith.	Kat	Sim.	Kan	Tul.	Vrsch	Dhan	Mak	Kum.	Min.	Asvn.	Bhar	Krit.	Rohi.	Mrig.	Ardh.	Punar	Push	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·6	120·0

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

Year	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360
	O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27	Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
1803	71·8	75·6	78·7	80·8	82·0	81·9	80·5	77·8	74·3	70·7	67·9	65·9	65·2	65·9	67·5	70·2	73·4	77·3	81·4
	197·4	208·4	211·6	206·1	200·3	203·2	214·4	229·5	246·1	263·7	281·0	297·2	310·4	317·8	315·9	308·8	308·0	317·6	331·9
	150·9	152·9	155·0	156·9	158·7	160·2	161·7	162·8	163·7	164·2	164·5	164·5	164·0	163·4	162·5	161·3	160·0	158·8	157·4
	219·7	230·1	239·8	248·6	256·3	262·0	265·0	264·2	259·4	253·6	249·8	250·3	254·4	260·7	269·7	278·1	288·0	298·5	309·3
	146·0	147·0	148·1	149·1	150·0	150·5	151·2	151·4	151·5	151·8	151·4	151·0	150·7	150·0	149·3	148·5	147·8	147·0	146·2
																Mr 6	Mr 16	Mr 26	Ap 5
1804	191·6	198·4	205·3	212·3	219·3	226·5	233·7	241·0	248·4	255·9	263·5	271·0	278·7	286·5	294·2	302·1	309·9	317·9	325·6
	195·7	192·6	185·8	186·1	195·4	209·3	225·7	243·0	260·4	276·8	290·7	299·6	300·1	292·6	289·9	297·1	310·1	327·0	345·3
	174·3	176·5	178·8	180·8	182·9	185·0	186·9	188·7	190·2	191·5	192·7	193·7	194·2	194·6	194·6	194·1	193·5	192·6	191·4
	171·6	184·0	196·6	209·2	221·7	234·2	246·9	259·5	272·0	284·6	297·2	309·7	322·0	334·3	346·6	358·8	9·7	22·5	34·5
	157·0	158·1	159·7	160·4	161·3	162·1	163·0	163·4	163·8	164·2	164·1	164·0	163·8	168·2	162·6	162·0	161·2	160·4	159·6
	O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 16	Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
1805	94·0	99·2	103·9	108·4	112·1	115·3	117·8	119·1	119·7	118·9	116·7	113·7	109·8	106·0	103·0	100·9	100·5	101·2	103·2
	170·8	168·2	176·1	189·4	205·4	222·5	239·7	256·5	271·1	281·3	283·9	277·8	272·9	277·5	289·6	305·3	323·2	341·6	359·8
	197·8	200·1	202·2	204·4	206·7	208·8	211·[illegible]	213·2	215·1	217·1	218·9	220·5	222·1	223·2	224·1	224·9	225·2	225·3	224·9
	127·4	137·1	148·5	158·5	170·0	181·2	193·1	205·1	217·2	229·3	241·7	254·2	266·5	278·9	291·4	303·7	316·2	328·7	341·0
	167·7	168·9	170·1	171·2	172·2	173·2	174·2	174·8	175·4	176·0	176·1	176·2	176·3	175·9	175·5	175·1	174·3	173·6	172·8
	O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27	Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
1806	205·5	212·2	219·2	226·3	233·7	241·1	248·5	255·7	263·7	271·5	279·1	287·0	294·8	302·7	310·6	318·4	326·4	331·2	342·0
	157·4	169·6	185·1	202·0	219·4	236·3	251·5	263·2	268·7	263·7	257·0	259·0	269·4	284·1	301·3	319·5	337·8	355·2	10·5
	222·[illegible]	224·5	226·5	228·5	230·8	233·0	235·4	237·5	239·8	242·0	244·3	246·3	248·4	250·2	252·0	253·4	254·8	255·8	256·6
	208·5	220·4	232·5	244·4	256·1	267·6	279·1	290·4	301·1	311·3	320·5	328·6	334·9	338·7	339·0	335·3	329·2	324·3	322·2
	178·2	179·1	180·5	181·9	182·9	184·0	185·1	185·8	186·6	187·4	187·5	187·9	188·2	188·0	187·7	187·5	186·9	186·8	185·7
1807	110·2	116·0	121·5	126·7	131·8	136·5	140·8	141·4	147·7	149·9	151·5	151·7	150·7	148·3	144·7	141·2	137·5	134·5	133·0
	164·5	181·3	198·7	215·9	231·7	244·6	251·6	249·8	242·0	241·2	249·9	263·4	279·8	297·5	315·8	3 3·2	349·0	0·9	4·8
	249·4	250·9	252·5	254·3	256·2	258·3	260·4	262·8	265·0	267·3	269·6	272·0	274·2	276·6	278·8	280·9	282·8	284·8	286·3
	153·4	165·6	178·9	190·4	202·9	215·5	228·1	240·9	253·5	266·2	278·7	291·3	304·0	316·6	328·9	341·4	353·9	6·3	18·6
	188·5	189·7	190·9	192·1	193·2	194·5	195·5	196·3	197·2	198·1	198·6	199·1	199·6	199·6	199·6	199·6	199·0	198·5	198·0
																Mr 6	Mr 16	Mr 26	Ap 5
1808	220·2	227·3	234·8	241·8	249·2	256·8	264·4	272·2	279·9	287·6	295·5	303·4	311·3	319·0	326·9	334·8	342·5	350·1	357·9
	177·7	195·5	212·0	225·8	235·0	235·5	228·5	224·5	230·3	243·4	259·2	276·6	294·4	311·8	327·8	340·3	346·4	342·5	336·0
	280·3	280·7	281·5	282·7	284·0	285·5	287·3	289·4	291·5	293·7	295·9	298·3	300·6	302·9	305·4	307·8	310·1	312·4	314·6
	183·8	177·4	172·5	171·8	174·5	180·2	187·9	197·2	206·8	217·4	228·3	239·8	251·3	263·1	275·0	287·2	299·3	311·2	323·4
	198·7	199·9	201·1	202·2	203·4	204·6	205·7	206·7	207·7	208·6	209·3	209·9	210·6	210·8	211·0	211·1	210·8	210·5	210·0
	O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26	Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
1809	124·3	130·2	136·0	142·7	147·4	152·9	158·2	163·0	167·9	172·4	176·3	179·9	182·7	184·6	185·8	185·5	183·9	180·8	177·3
	191·8	206·7	217·5	220·7	214·9	209·3	212·5	223·7	238·8	255·6	273·2	290·6	306·9	320·3	327·[illegible]	326·0	318·8	318·5	327·4
	316·7	316·0	315·7	315·4	316·9	316·5	317·3	318·6	320·1	321·9	323·8	325·8	328·0	330·2	332·5	335·0	337·4	339·8	342·2
	190·5	203·1	215·5	228·0	240·5	252·7	265·1	277·6	289·8	302·0	314·0	325·9	337·6	349·1	0·1	10·8	21·0	30·4	38·0
	208·6	209·7	210·8	212·0	213·2	214·4	215·5	216·6	217·7	218·8	219·6	220·4	221·2	221·5	221·9	222·2	222·3	222·3	221·8
	O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27	Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
1810	237·5	244·5	251·8	259·0	266·5	274·1	281·6	289·4	297·1	304·8	312·6	320·3	327·9	335·8	343·3	350·7	358·2	5·7	13·0
	199·3	205·0	201·5	194·4	194·9	204·5	218·5	234·8	252·3	269·8	286·3	300·4	309·3	309·7	302·8	299·8	307·0	320·4	337·0
	357·7	355·3	355·0	353·7	352·8	352·3	352·0	352·1	352·5	353·3	354·4	355·6	357·2	359·0	1·1	3·1	5·4	[illegible]·6	10·0
	136·8	148·6	160·8	172·7	185·1	197·3	209·7	222·2	235·6	247·4	260·1	272·8	285·0	297·7	310·4	323·0	335·3	347·[illegible]	0·3
	21[illegible]·6	219·7	220·7	221·8	223·0	224·3	225·5	226·6	227·7	228·8	229·6	230·6	231·5	232·0	232·5	233·0	233·1	233·1	233·1
1811	137·0	143·2	149·3	155·3	161·3	167·1	173·1	178·8	186·5	190·1	195·5	200·6	205·7	210·4	214·8	218·9	222·6	225·8	227·4
	187·5	189·5	177·8	186·0	198·4	214·6	231·5	249·0	265·6	280·6	291·2	293·6	287·5	282·5	287·5	299·2	315·2	332·8	351·5
	38·1	37·2	36·0	34·8	33·3	32·0	30·7	29·7	28·8	28·3	28·2	28·4	28·9	29·8	30·9	32·2	33·[illegible]	35·6	37·7
	219·8	230·1	239·4	247·9	255·3	260·1	262·0	260·4	255·6	250·2	247·4	248·8	253·5	260·1	269·1	278·0	288·1	298·7	309·9
	228·6	229·6	230·5	231·6	232·8	234·0	235·1	236·1	237·3	238·5	239·5	240·5	241·6	242·2	242·9	243·6	243·9	244·1	244·8
																Mr 6	Mr 16	Mr 26	Ap 5
1812	258·6	265·2	272·1	279·1	286·3	293·6	301·9	308·4	315·7	323·1	330·5	337·8	345·2	352·5	359·8	6·8	13·8	21·0	27·8
	164·2	166·8	178·7	194·4	211·2	228·6	245·4	260·7	272·4	277·2	273·1	266·3	268·4	278·6	293·8	311·3	329·2	347·7	5·1
	73·6	73·7	73·8	73·3	72·6	71·6	70·3	68·7	67·7	66·4	65·1	64·1	63·5	63·2	63·1	63·5	64·0	65·0	66·1
	172·2	184·7	197·3	209·8	222·3	234·8	247·5	260·1	272·7	285·2	297·8	310·3	322·6	334·8	347·2	359·3	10·4	23·0	34·9
	238·7	239·6	240·5	241·4	242·5	243·6	244·8	246·0	247·2	248·3	249·4	250·4	251·5	252·4	253·3	254·1	254·5	254·9	255·3
	O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26	Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
1813	149·4	155·7	161·8	168·3	174·4	180	187·0	193·1	199·3	205·5	211·8	218·0	224·1	230·2	236·2	242·3	248·0	253·8	259·4
	159·0	173·2	190·7	208·0	225·3	241·0	253·8	260·7	258·7	251·2	250·7	258·9	278·0	289·7	307·5	325·8	343·4	359·2	11·2
	103·5	104·7	105·6	106·4	106·7	106·9	106·6	105·9	105·1	103·9	102·6	101·3	99·9	98·7	97·6	96·7	96·4	96·0	96·3
	127·4	137·2	148·5	158·6	171·0	181·6	193·5	205·5	217·7	229·9	242·2	254·7	267·1	279·4	292·0	304·3	316·8	32[illegible]·3	341·6
	249·1	249·8	250·6	251·3	252·4	253·4	254·5	255·7	256·9	258·1	259·2	260·4	261·5	262·4	263·3	264·3	264·9	265·5	266·1
	O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27	Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
1814	291·1	295·6	300·7	306·0	311·8	317·9	324·1	330·6	336·9	343·1	350·0	356·6	3·2	9·8	1[illegible]·5	23·0	29·7	36·[illegible]	42·7
	169·8	186·5	204·8	221·2	235·0	244·0	244·4	237·1	233·7	239·9	252·7	268·4	286·0	303·9	321·7	337·7	350·7	356·5	353·6
	130·0	131·7	133·4	134·8	136·2	137·1	137·8	138·3	138·3	138·1	137·6	136·6	135·5	134·2	132·9	131·5	130·3	129·2	128·4
	209·0	220·8	232·8	244·8	256·5	267·9	279·4	290·5	301·1	311·2	320·0	327·7	333·6	333·6	336·0	331·8	326·0	322·0	320·8
	259·7	260·2	260·8	261·4	262·4	263·4	264·4	265·6	266·8	267·9	269·0	270·3	271·4	272·5	273·5	274·6	275·4	276·1	276·8

Mag.	P. Phal.	U. Phal	Hasta.	Chit	Svati.	Visa.	Anur.	Jyesh.	Mula	P. Ash.	U. Ash.	Srav	Dan.	Satab	P. Bhad.	U. Bhad.	Revati
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·6	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle.
Venus, A.D. 1765—A.D. 1999;

Year	Day of I. S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng date ..	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1814	Mars ..	46·3	52·7	59·3	65·7	72·2	78·6	85·0	91·4	97·8	104·2	110·6	116·8	123·2	129·6	136·0	142·3	148·7	155·2
	Merc.	349·3	346·3	353·1	6·7	23·8	42·3	61·4	80·0	97·8	111·8	120·5	119·5	112·0	110·6	119·1	132·5	149·1	166·5
	Jup. ..	128·0	127·7	127·7	127·8	128·5	129·3	130·4	131·8	133·4	135·1	137·1	139·1	141·2	143·2	145·3	147·7	149·8	152·0
	Ven	323·9	328·3	335·0	343·3	352·7	2·5	12·1	23·7	34·9	46·8	57·9	69·5	81·3	92·9	104·9	117·1	129·3	141·6
	Sat	277·1	277·4	277·6	277·8	277·5	277·2	276·9	276·2	275·5	274·8	274·1	273·3	272·5	271·9	271·4	270·8	270·7	270·7
1815	Mars ..	285·8	292·7	299·4	306·4	313·1	319·7	326·2	332·5	338·5	344·4	349·6	354·2	358·2	1·5	3·6	4·1	3·9	2·0
	Merc ...	332·8	345·0	1·3	19·6	38·5	57·5	75·1	90·4	100·9	102·2	95·4	92·1	98·6	111·5	127·7	145·2	163·2	180·6
	Jup. .	161·4	160·3	159·4	158·5	158·1	158·1	158·1	158·8	159·6	160·6	161·9	163·5	165·8	167·1	169·1	171·2	173·2	175·8
	Ven. ..	25·5	37·6	49·6	61·6	73·7	85·3	96·8	108·4	119·5	130·5	141·2	151·1	160·8	169·4	176·7	182·3	185·0	184·2
	Sat. ..	288·1	288·4	288·8	289·3	289·1	289·0	288·9	288·3	287·7	287·2	286·4	285·6	284·9	284·2	283·5	282·8	282·5	282·3
	Eng. date ..	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1816	Mars ..	61·0	67·2	73·1	79·2	85·3	91·4	97·6	103·8	110·0	116·3	122·4	128·8	135·1	141·5	147·9	154·2	160·8	167·3
	Merc.	339·0	356·8	15·5	34·5	52·6	68·7	80·3	84·3	78·5	73·3	78·4	90·4	106·2	123·8	141·8	159·8	176·2	189·7
	Jup	195·5	193·2	193·0	191·6	190·4	189·3	188·6	188·2	188·2	188·4	188·8	189·7	190·0	191·9	194·2	195·2	197·1	199·1
	Ven. ...	330·4	342·6	354·7	7·1	19·3	31·5	43·8	56·0	68·1	80·6	92·6	105·0	116·9	129·5	141·7	154·2	166·7	178·9
	Sat ..	298·9	299·5	300·1	300·7	300·8	300·9	301·0	300·6	300·2	299·8	299·1	298·4	297·6	296·8	296·0	295·3	294·9	294·4
	Eng date .	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1817	Mars ..	305·2	312·7	320·3	327·7	335·3	342·7	350·1	357·2	4·2	11·2	17·8	24·3	30·6	36·5	42·2	47·3	52·0	55·2
	Merc. ..	352·9	11·6	29·9	46·6	59·6	65·2	61·1	54·8	57·9	68·7	84·4	101·8	120·1	138·3	155·0	170·2	180·2	181·6
	Jup	229·2	228·5	227·5	226·5	225·2	223·8	222·5	221·3	220·3	219·5	219·0	218·8	219·1	219·5	220·4	221·5	222·9	224·3
	Ven	41·6	46·4	48·3	46·6	41·7	36·0	30·5	33·0	36·6	43·1	50·9	58·9	69·8	80·2	90·8	102·1	113·5	125·4
	Sat.	309·8	310·6	311·3	312·2	312·6	312·9	313·2	313·0	312·8	312·6	312·0	311·4	310·7	309·9	309·1	308·2	307·6	307·0
1818	Mars	77·1	82·3	87·7	93·4	99·1	104·7	110·6	116·6	122·5	128·7	134·8	141·0	147·4	153·7	160·0	166·6	173·1	179·7
	Merc .	7·3	24·3	38·1	45·7	43·3	36·1	37·3	47·0	62·0	79·6	98·1	116·4	134·3	149·9	161·6	165·7	160·7	154·4
	Jup	261·2	261·5	261·7	261·4	260·8	260·0	258·8	257·6	256·3	204·9	253·7	252·6	251·8	251·1	251·0	251·2	251·5	252·2
	Ven. .	7·6	19·8	32·1	44·5	56·7	68·9	81·0	92·9	105·1	117·0	128·9	140·9	152·6	164·2	175·9	187·3	198·5	209·4
	Sat ...	320·8	321·8	322·7	323·7	324·3	324·9	325·4	325·5	325·5	325·5	325·0	324·5	324·0	323·2	322·4	321·7	320·9	320·2
1819	Mars	323·0	330·8	338·6	346·3	353·8	1·3	8·9	16·2	23·4	30·4	37·4	44·2	51·0	57·5	63·6	69·7	75·6	81·4
	Merc ..	16·6	25·6	25·0	18·0	16·6	25·3	39·9	57·1	75·6	94·3	112·4	128·9	142·2	148·4	145·8	138·4	136·6	148·3
	Jup ..	291·0	292·6	293·7	294·7	295·4	295·5	295·6	295·4	294·4	293·5	202·2	290·8	289·4	288·2	287·1	286·2	285·4	285·0
	Ven. ...	316·1	327·4	339·0	350·8	2·8	14·7	26·5	38·4	50·4	62·6	74·5	86·7	98·7	111·1	123·3	135·6	148·1	160·4
	Sat. ..	332·1	333·2	334·3	335·4	336·2	337·0	337·8	338·0	338·3	338·5	338·3	338·1	337·7	337·0	336·7	335·6	334·8	334·0
	Eng. date	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1820	Mars ..	95·9	99·6	[illegible]	108·8	113·8	119·0	121·6	130·0	135·9	141·8	147·7	154·0	160·2	166·5	172·9	179·1	186·3	192·9
	Merc	7·0	0·5	357·0	3·3	17·3	34·3	52·7	71·7	90·4	107·5	121·8	130·5	129·7	122·6	120·9	128·9	142·2	158·6
	Jup	319·6	321·6	323·6	325·6	327·1	328·5	329·7	330·5	330·9	331·1	331·0	330·5	329·7	328·7	327·4	326·0	324·6	323·2
	Ven.	11·2	52·5	63·6	74·1	84·0	93·5	101·7	108·5	113·0	114·5	112·3	106·3	101·1	98·2	98·8	103·2	109·6	117·7
	Sat.	343·4	344·6	345·8	347·1	348·1	349·0	350·0	350·6	351·2	351·6	351·6	351·6	351·5	351·0	350·5	349·[illegible]	349·1	348·3
	Eng. date	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1821	Mars .	339·9	347·7	355·3	3·0	10·6	18·0	25·3	32·6	39·8	46·9	53·6	60·[illegible]	67·1	73·7	80·1	86·3	92·6	98·6
	Merc ..	338·8	313·0	355·5	11·8	29·9	48·9	67·8	86·1	100·8	111·1	113·0	106·2	102·8	108·6	121·2	137·6	155·2	172·7
	Jup .	347·5	349·9	352·2	354·5	356·6	358·8	0·9	2·6	4·1	5·5	6·5	7·3	7·5	7·7	7·3	6·8	5·8	4·6
	Ven. .	348·2	1·2	13·7	25·8	38·5	50·6	62·9	75·2	87·3	99·5	111·8	124·0	136·1	148·2	160·8	173·0	185·1	197·2
	Sat .	355·1	356·4	357·7	359·0	0·1	1·3	2·4	3·1	3·9	4·7	4·9	5·2	5·4	5·1	4·8	4·4	3·7	3·0
1822	Mars ..	120·3	121·8	124·3	127·4	131·2	135·5	140·4	145·4	150·8	156·4	162·3	168·1	174·4	180·6	187·2	193·7	200·4	207·3
	Merc	333·8	349·2	7·0	25·6	44·6	63·2	78·8	91·1	94·9	89·5	84·2	88·9	100·6	116·2	133·5	151·5	169·3	185·5
	Jup.	14·8	17·2	19·6	22·0	24·4	26·8	29·1	31·4	33·6	35·4	37·5	39·1	40·6	41·8	42·7	43·5	43·8	43·7
	Ven. .	322·5	327·5	334·6	343·1	352·7	2·7	12·5	24·1	35·8	46·8	58·4	70·0	81·8	93·5	105·5	117·7	129·9	112·7
	Sat. ...	7·0	8·3	9·6	10·9	12·1	13·4	14·7	15·6	16·6	17·6	18·1	18·7	19·2	19·2	19·1	19·0	18·5	18·0
1823	Mars	355·[illegible]	3·3	11·0	18·4	25·7	33·0	40·3	47·3	54·3	61·7	68·1	74·8	81·4	87·9	94·3	100·6	106·8	113·0
	Merc ...	344·7	3·0	22·0	40·4	57·1	70·1	76·1	72·8	65·9	68·2	79·1	94·5	111·9	130·1	148·1	165·1	179·6	189·4
	Jup. .	42·7	44·9	47·0	49·2	51·4	53·9	56·2	58·5	60·9	63·2	65·5	67·6	69·6	71·3	73·0	74·7	76·1	77·1
	Ven. .	26·1	38·2	50·2	62·3	74·2	85·8	97·3	108·8	119·9	130·8	141·4	151·2	160·6	168·9	175·8	180·7	182·6	180·8
	Sat. ...	19·2	20·5	21·8	23·2	24·5	25·8	27·2	28·3	29·5	30·6	31·3	32·1	32·8	33·1	33·4	33·6	33·3	32·9
	Eng. date ..	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1824	Mars .	156·0	153·9	153·1	153·6	155·0	157·6	160·8	164·9	169·2	174·1	179·4	185·0	190·8	197·1	203·3	209·8	216·6	223·4
	Merc.	359·8	17·6	34·7	48·8	56·5	54·8	47·6	47·7	57·7	73·6	89·8	108·2	126·5	141·2	159·6	171·2	175·4	170·0
	Jup. ..	70·9	72·[illegible]	74·0	75·8	77·8	79·9	82·0	84·2	86·6	88·9	91·1	93·5	95·7	98·0	100·0	102·1	103·9	105·7
	Ven .	331·0	343·2	355·2	7·7	19·9	32·1	44·4	56·6	68·7	81·8	93·3	105·6	117·9	130·[illegible]	142·2	154·8	167·3	179·5
	Sat. ..	31·6	32·9	34·2	35·5	36·9	38·2	39·6	40·8	42·1	43·3	44·4	45·4	46·5	46·9	47·3	47·8	47·8	47·7
	Eng. date ...	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1825	Mars .	11·1	18·5	25·7	32·9	40·1	47·2	54·1	60·9	67·9	74·5	81·2	87·9	94·4	100·9	107·2	113·5	119·9	125·1
	Merc. ...	12·3	27·3	37·4	36·4	29·2	27·6	36·3	50·3	67·8	85·7	104·4	122·5	138·9	152·1	157·9	155·8	148·2	149·1
	Jup. ...	100·7	101·3	102·1	103·1	104·5	105·9	107·3	109·3	111·7	113·8	116·0	118·1	120·3	122·6	124·7	127·0	129·2	131·2
	Ven ..	40·7	41·9	45·9	43·3	38·0	32·6	28·0	31·4	35·7	42·6	50·7	59·8	69·9	80·4	91·2	102·5	114·0	125·9
	Sat .	44·4	45·7	47·0	48·2	49·5	50·8	52·1	53·4	54·7	56·1	57·3	58·4	59·6	60·4	61·1	61·9	62·1	62·4

Mesh.	Vrish.	Mith.	Kat.	Sim.	Kan	Tul.	Vrsch	Dhan.	Mak.	Kum	Min.	Asvn	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

V-B—cont.

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

Year	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360
	O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27	Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
1815	161.6	168.0	174.6	180.8	187.5	194.0	200.6	207.1	213.8	220.4	227.1	234.0	240.7	247.5	254.3	261.2	268.4	275.1	282.1
	184.3	201.0	215.8	226.6	229.6	223.5	218.0	221.8	232.8	247.8	265.1	282.9	300.2	316.6	330.2	338.1	336.6	329.1	328.7
	154.2	156.3	158.4	160.4	162.1	163.8	165.2	166.5	167.5	168.1	168.5	168.7	168.6	167.9	167.0	165.9	164.7	163.4	162.1
	158.9	166.2	179.4	191.1	203.6	216.2	228.8	241.4	254.2	266.8	279.4	291.9	304.7	317.1	329.6	342.0	354.6	6.9	19.1
	270.6	271.0	271.4	271.9	272.8	273.7	274.5	275.4	276.8	277.2	278.4	279.6	280.7	281.8	283.0	284.1	285.2	286.1	287.1
																Mr 6	Mr 16	Mr 26	Ap 5
1816	0.1	357.2	355.3	354.5	351.8	356.2	358.4	1.5	5.1	9.2	13.6	18.6	23.9	29.2	34.6	40.3	46.2	52.0	5[illegible]
	196.2	208.6	214.0	210.5	208.4	204.0	213.3	227.6	243.7	261.6	279.2	295.8	309.9	319.4	319.8	313.2	310.1	317.0	330.4
	177.5	179.9	181.9	184.2	186.3	188.4	190.8	192.0	193.7	195.3	196.3	197.3	198.1	198.7	198.7	198.5	198.1	197.1	196.1
	179.9	173.9	170.0	170.0	173.4	179.6	187.6	197.0	206.9	217.6	228.7	240.2	251.8	263.5	275.6	287.8	299.9	311.7	324.0
	282.0	282.2	282.4	282.8	283.5	284.9	285.0	286.0	287.1	288.1	289.3	290.5	291.8	293.0	294.2	295.3	296.3	297.4	298.4
	O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26	Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
1817	173.7	180.4	187.1	193.6	200.5	207.3	214.1	221.0	228.0	235.2	242.2	249.4	256.7	264.0	271.2	278.8	286.2	293.7	301.3
	197.2	196.4	188.9	187.1	194.8	207.7	223.7	241.0	258.5	275.2	290.0	300.7	303.3	296.9	292.2	297.3	309.0	325.3	343.0
	201.2	203.4	205.4	207.6	209.8	212.2	214.2	216.4	218.6	220.5	222.3	224.1	225.6	226.1	228.0	228.8	229.3	229.5	229.5
	191.5	203.7	216.2	228.6	241.1	253.2	265.7	278.1	290.8	302.5	314.5	326.3	338.0	349.4	0.3	10.9	20.9	30.1	37.6
	293.9	293.9	294.0	294.0	294.5	295.1	295.7	296.7	297.7	298.6	299.8	301.0	302.1	303.3	304.5	305.8	307.0	308.1	309.3
	O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27	Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
1818	59.5	62.0	63.4	63.7	62.6	60.2	57.4	54.1	51.3	49.5	48.7	49.5	51.1	53.7	56.8	60.6	64.8	69.5	74.4
	174.8	170.6	176.2	188.0	203.4	220.4	237.8	254.8	270.1	282.1	286.5	282.1	275.8	278.1	288.4	303.5	320.9	339.3	357.8
	226.1	228.0	230.0	232.1	234.4	236.5	238.9	241.1	243.4	245.5	247.8	249.9	251.9	253.9	255.8	257.4	258.8	259.9	261.8
	137.3	149.1	161.3	173.3	185.7	197.9	210.3	222.8	236.0	248.0	260.7	273.4	285.6	298.4	311.0	323.6	335.9	348.4	0.9
	306.4	306.2	306.0	305.8	306.2	306.5	306.9	307.8	308.6	309.5	310.6	311.7	312.8	314.0	315.3	316.5	317.8	319.0	320.2
1819	186.3	193.1	200.0	206.8	213.9	221.0	228.0	235.3	242.6	250.0	257.8	264.9	272.5	280.1	287.8	295.6	303.4	311.2	318.9
	157.6	168.4	183.2	199.9	217.3	234.4	250.3	263.0	270.5	267.9	260.5	260.0	268.4	282.4	299.2	317.3	335.6	353.4	9.2
	253.3	254.6	256.3	258.0	260.0	262.0	264.0	266.8	268.5	270.9	278.1	275.4	277.8	280.1	282.5	284.6	286.6	288.5	290.4
	219.9	230.0	239.1	247.2	254.3	257.9	259.0	256.4	251.9	246.8	245.0	247.4	252.6	259.6	268.5	277.9	288.3	299.0	310.1
	319.4	319.1	318.7	318.2	318.4	318.5	318.7	319.3	319.9	320.6	321.7	322.8	323.8	325.0	326.2	327.5	328.8	330.1	331.3
																Mr 6	Mr 16	Mr 26	Ap 5
1820	86.8	91.1	95.5	99.2	102.4	104.7	106.0	106.1	105.0	102.3	98.8	95.1	91.6	88.9	87.7	87.6	88.8	91.1	94.0
	162.9	179.3	196.8	213.9	230.3	244.3	253.1	253.4	246.1	248.0	249.1	262.0	278.0	295.7	313.8	331.6	347.9	1.0	7.5
	284.9	285.3	285.9	286.8	288.2	289.5	291.3	293.1	295.2	297.4	299.6	301.9	301.2	306.7	309.1	311.3	313.7	316.1	318.5
	172.9	185.4	198.0	210.4	222.9	235.4	248.1	260.7	273.4	285.8	298.4	310.9	323.2	335.4	347.8	359.8	11.1	23.5	35.8
	333.2	332.6	332.1	331.5	331.4	331.3	331.2	331.7	332.2	332.7	333.6	334.5	335.3	336.5	337.7	338.9	340.2	341.5	342.8
	O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26	Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
1821	199.8	206.7	213.6	220.9	228.0	235.2	242.6	251.1	257.6	265.2	273.0	280.7	288.4	296.3	304.1	312.1	320.0	327.8	335.8
	176.0	193.5	210.3	224.9	235.5	238.2	232.8	227.1	230.8	242.0	257.3	274.4	292.2	309.9	326.7	340.1	348.4	347.2	340.0
	322.2	321.3	320.8	320.4	320.6	321.0	321.9	323.0	324.4	326.0	327.7	329.7	331.8	334.0	336.4	338.7	341.1	343.6	346.0
	127.3	137.3	148.6	158.7	171.2	182.0	193.9	206.0	218.2	230.5	242.7	255.2	267.6	280.0	292.6	304.9	317.4	329.9	342.2
	347.5	346.7	346.0	345.2	344.8	344.5	344.2	344.4	344.7	345.0	345.7	346.4	347.2	348.3	349.4	350.5	351.8	353.1	354.4
	O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27	Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
1822	104.3	109.9	115.1	120.1	124.8	129.0	132.7	135.7	138.0	139.2	139.6	138.2	135.5	132.2	128.2	124.8	121.9	120.1	119.9
	190.1	205.5	218.0	224.0	219.1	211.2	213.2	222.7	237.0	253.4	271.0	288.8	305.5	320.0	329.3	330.1	323.0	320.2	327.1
	3.4	2.0	0.7	359.2	358.2	357.6	357.0	357.0	357.2	357.8	358.7	359.9	1.4	3.2	5.0	7.0	9.1	11.5	13.8
	209.4	221.2	233.2	245.2	256.9	268.3	279.6	290.6	301.1	311.0	319.5	326.9	332.3	334.5	333.0	328.3	322.8	319.6	319.5
	2.3	1.5	0.7	359.8	359.2	358.6	358.1	358.0	358.0	358.0	358.5	359.1	359.6	0.6	1.5	2.5	3.7	4.9	6.2
1823	214.2	221.2	228.3	235.6	243.1	250.5	258.1	265.7	273.3	281.2	288.9	296.9	304.8	312.6	320.5	328.4	336.3	344.0	351.7
	199.0	206.6	205.6	198.0	196.2	203.9	217.0	233.0	250.2	267.7	284.5	299.5	310.3	313.1	307.1	302.0	307.3	319.1	335.2
	43.3	42.6	41.6	40.4	39.0	37.3	36.4	35.0	34.3	33.5	33.2	33.2	33.5	34.3	35.3	36.4	37.9	39.6	41.4
	154.5	166.8	179.8	191.7	204.2	216.8	229.4	242.0	254.8	267.5	280.0	292.5	305.3	317.7	330.2	342.7	355.2	7.5	19.7
	17.8	16.5	15.7	14.8	14.1	13.4	12.7	12.3	12.0	11.7	12.0	12.2	12.5	13.4	14.2	14.9	15.1	17.2	18.4
																Mr 6	Mr 16	Mr 26	Ap 5
1824	119.0	124.9	130.6	136.2	141.6	146.8	151.7	156.4	160.6	164.2	167.6	170.0	171.6	171.7	170.8	168.5	165.1	161.2	157.4
	191.0	184.0	179.9	185.3	197.3	212.6	229.3	246.9	264.1	279.4	291.4	296.3	292.0	285.5	287.6	298.4	313.4	330.9	349.4
	77.9	78.2	78.4	78.1	77.6	76.7	75.6	74.2	73.0	71.8	70.5	69.5	68.6	68.1	68.1	68.1	68.5	69.3	70.1
	176.1	170.5	167.4	168.3	172.4	179.1	187.4	196.9	207.0	217.8	229.0	240.5	252.2	264.0	276.1	288.3	300.4	312.5	324.6
	32.5	31.8	31.1	30.3	29.4	28.7	27.8	27.2	26.7	26.2	26.1	26.1	26.1	26.7	27.3	27.9	28.9	29.9	30.9
	O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26	Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
1825	230.4	237.5	244.7	252.1	259.5	267.2	274.8	282.4	290.2	298.0	305.8	313.6	321.4	329.2	336.8	344.6	352.1	359.7	7.1
	163.9	167.1	177.6	192.4	209.1	226.4	243.6	259.5	272.4	279.4	277.3	270.1	269.2	278.3	292.3	309.0	327.3	345.1	3.7
	107.2	108.7	109.7	110.5	111.0	111.2	110.9	110.5	109.8	108.8	107.7	106.4	105.0	103.9	102.7	101.7	101.1	100.8	100.8
	192.1	204.4	216.8	229.2	241.6	253.8	266.3	278.6	290.9	303.0	314.9	326.7	338.4	349.7	0.5	10.9	20.8	29.8	37.2
	47.6	47.0	46.4	45.9	45.0	44.2	43.3	42.6	41.0	41.1	40.9	40.6	40.3	40.6	40.9	41.2	42.0	42.8	43.7
	O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27	Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
1826	132.3	138.3	144.3	150.3	156.0	161.8	167.3	172.8	178.3	183.5	188.5	193.1	197.5	201.4	204.6	207.4	209.2	210.2	209.9
	158.0	172.2	188.6	206.0	223.3	239.7	258.4	262.4	262.4	255.2	252.0	258.6	271.5	287.5	305.3	323.5	341.5	358.0	11.6
	133.2	135.0	136.8	138.3	139.7	140.9	141.7	142.2	142.4	142.3	141.9	141.2	140.1	139.0	137.7	136.5	135.1	134.0	133.1
	137.8	149.6	161.8	173.9	186.3	198.5	210.9	223.4	236.4	248.6	261.3	274.0	286.3	299.0	311.6	324.2	336.6	349.0	1.5
	62.5	62.2	61.9	61.4	60.7	60.0	59.2	58.4	57.6	56.7	56.2	55.6	55.1	55.1	55.1	55.1	55.7	56.4	56.9

Mag.	P. Phal.	U Phal	Hasta	Chit.	Svati.	Vis.	Anur	Jyesh.	Mula.	P. Ash.	U. Ash	Śrav	Dan.	Satab.	P. Bhad.	U Bhad.	Revati
133.3	146.7	160.0	173.3	186.7	200.0	213.3	226.7	240.0	253.3	266.7	280.0	293.3	306.7	320.0	333.3	346.7	360.0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle.

Venus, A.D. 1765—A.D. 1999;

Day of 18 Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
Eng date	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1826 Mars	209·0	206·9	204·1	200·9	197·7	195·8	195·1	195·9	197·5	200·4	203·8	208·1	212·9	218·1	223·9	229·8	236·3	242·9
Merc	15·7	18·0	11·3	7·7	14·7	27·9	45·3	63·1	82·1	101·2	117·7	131·8	140·4	139·9	133·0	130·7	138·7	151·9
Jup.	132·6	132·1	132·0	132·0	132·1	133·2	134·3	135·5	137·0	138·6	140·4	142·4	144·4	146·5	148·6	150·8	153·0	155·2
Ven.	8·2	20·4	32·7	45·1	57·3	69·5	81·6	93·5	105·6	117·5	129·4	141·4	153·1	164·6	176·4	187·6	198·8	209·7
Sat.	57·4	58·5	59·7	60·8	62·1	63·4	64·7	66·0	67·4	68·8	70·1	71·3	72·5	73·5	74·5	75·5	76·0	76·4
1827 Mars	25·9	32·9	39·8	46·9	53·6	60·5	67·3	73·9	80·5	87·1	93·8	100·2	106·6	113·1	119·5	125·9	132·2	138·5
Merc.	354·3	348·8	353·3	5·9	22·0	40·2	59·3	78·0	95·7	110·9	121·4	123·3	116·8	112·9	118·6	131·3	147·0	164·3
Jup.	166·1	164·9	163·8	162·9	162·3	162·2	162·2	162·4	163·4	164·4	165·6	167·1	168·8	170·6	172·5	174·6	176·6	178·8
Ven.	316·4	327·8	339·5	351·3	3·3	15·2	27·0	39·0	51·0	63·2	75·2	87·3	99·3	111·7	123·9	136·2	148·7	161·0
Sat	70·7	71·6	72·5	73·5	74·7	75·9	77·1	78·5	79·9	81·2	82·5	83·8	85·2	86·3	87·4	88·5	89·3	90·1
Eng. date	Ap 10	Ap 20	Ap 30	My 10	My 20	My 30	Je 9	Je 19	Je 29	Jl 9	Jl 19	Jl 29	Au 8	Au 18	Au 28	S 7	S 17	S 27
1828 Mars	250·8	254·8	258·4	261·2	263·1	264·1	264·0	262·5	260·7	257·9	255·5	253·9	254·2	255·5	258·0	261·3	265·7	270·5
Merc	332·5	343·8	359·5	17·4	36·3	55·2	73·6	89·7	101·6	105·6	100·2	94·9	99·1	110·6	125·9	143·3	161·0	178·6
Jup.	200·1	198·9	198·2	196·2	195·1	194·1	193·1	192·6	192·5	192·5	192·8	193·6	194·5	195·8	197·3	198·9	200·6	202·6
Ven.	41·6	52·8	63·8	74·3	84·5	93·8	101·2	107·6	111·1	112·1	108·9	102·5	97·9	95·9	97·3	102·3	109·2	117·4
Sat	84·2	85·0	85·7	86·3	87·4	88·5	89·7	90·8	92·3	93·5	94·8	96·1	97·5	98·8	100·1	101·3	102·2	103·2
Eng. date	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1829 Mars	40·5	47·1	53·7	60·3	67·0	73·5	80·0	86·6	93·0	99·4	105·8	112·2	118·7	125·0	131·4	137·8	144·1	150·5
Merc.	337·5	354·9	13·4	32·3	50·8	67·5	80·6	87·0	85·3	76·7	78·9	89·5	104·0	121·7	139·8	157·8	174·1	189·1
Jup.	233·7	232·5	232·0	231·3	230·0	228·7	227·3	226·2	225·0	224·2	223·5	223·2	223·2	223·6	224·4	225·4	226·5	227·9
Ven	349·1	1·8	14·3	26·6	39·1	51·2	63·5	75·9	87·9	100·1	112·5	124·6	136·7	148·8	161·3	173·5	185·6	197·7
Sat.	98·0	98·4	98·8	99·3	100·3	101·2	102·0	103·2	104·4	105·6	107·0	108·3	109·6	110·9	112·1	113·4	114·5	115·6
1830 Mars	277·3	283·8	290·1	296·5	302·6	308·5	314·0	319·4	324·3	328·6	332·4	334·9	336·3	336·2	335·0	332·8	330·2	328·4
Merc.	350·7	9·6	28·0	45·2	59·4	67·2	65·9	58·7	58·8	69·4	8·7	99·8	118·0	136·4	153·5	169·1	180·7	184·5
Jup.	265·2	265·9	266·9	266·0	265·7	265·0	264·0	262·8	261·5	260·2	258·9	257·7	256·8	256·0	255·7	255·6	255·8	256·5
Ven.	321·1	326·7	334·2	342·9	352·6	2·9	13·0	24·4	35·6	47·2	58·9	70·5	82·3	94·0	106·1	118·3	130·5	142·8
Sat.	111·8	112·0	112·1	112·3	113·1	113·8	114·4	115·5	116·6	117·7	119·0	120·3	121·4	122·8	124·1	125·4	126·6	127·8
1831 Mars	55·3	61·4	67·7	73·9	80·0	86·1	92·7	98·9	105·2	111·4	117·9	124·1	130·4	136·8	143·1	149·4	155·9	162·5
Merc.	5·6	22·8	37·7	47·1	47·7	40·6	38·7	46·4	60·7	77·6	96·1	114·4	132·4	148·6	161·7	168·0	165·2	157·9
Jup	295·0	296·6	297·9	299·0	300·1	300·3	300·5	300·0	299·5	298·7	297·7	296·4	295·1	293·8	292·6	291·5	290·6	290·0
Ven.	26·7	38·8	50·7	62·7	74·7	86·3	97·7	109·2	120·3	131·1	141·6	151·2	160·4	168·1	174·8	179·0	180·2	177·4
Sat	125·7	125·6	125·4	125·3	125·8	126·3	126·8	127·7	128·6	129·4	130·6	131·8	133·1	134·4	135·7	136·9	138·1	139·3
1832 Mars	297·7	305·1	312·5	320·0	327·2	334·3	341·7	348·5	355·5	2·1	8·4	14·6	20·2	25·8	30·7	34·8	38·4	41·0
Merc.	15·7	26·8	29·1	22·0	18·9	25·2	38·5	55·0	73·3	92·0	110·4	127·5	141·8	149·9	149·7	142·1	140·5	148·0
Jup.	323·3	325·5	327·6	329·5	331·2	332·8	334·0	335·0	335·7	336·1	336·3	335·8	335·2	334·2	333·0	331·7	330·3	328·9
Ven.	331·6	343·8	355·8	8·3	20·5	32·7	45·0	57·2	69·2	81·8	93·9	106·2	118·5	130·7	142·7	155·4	167·9	180·1
Sat.	139·5	139·1	138·7	138·5	138·7	139·0	139·1	139·8	140·6	141·2	142·3	143·3	144·5	145·7	146·9	148·2	149·5	150·8
1833 Mars	70·5	76·2	81·9	87·7	93·5	99·4	105·5	111·5	117·6	123·7	129·9	136·2	142·5	148·9	155·2	161·7	168·2	174·8
Merc.	10·1	5·3	359·8	4·2	16·4	32·1	50·6	69·4	88·5	105·3	121·2	131·9	133·4	126·9	122·9	128·7	141·0	156·6
Jup.	351·0	353·4	355·8	358·2	0·4	2·6	4·6	6·5	8·2	9·7	10·9	11·8	12·4	12·7	12·5	12·1	11·5	10·4
Ven	39·8	13·4	43·5	40·0	34·3	29·2	25·5	29·8	34·8	42·1	50·5	59·5	70·0	80·6	91·6	102·9	114·5	126·4
Sat.	153·1	152·5	152·0	151·4	151·3	151·4	151·3	151·8	152·4	152·8	153·7	154·6	155·6	156·7	157·8	159·0	160·3	161·6
1834 Mars	316·2	323·9	331·7	339·2	346·9	354·4	1·9	9·1	16·4	23·5	30·4	37·3	43·7	50·8	56·1	62·1	67·7	72·8
Merc.	341·6	343·3	351·6	8·9	27·7	46·6	65·6	83·6	99·8	111·9	116·2	110·9	105·1	108·6	120·5	135·7	152·8	170·5
Jup	18·8	21·2	23·6	26·0	28·4	30·8	33·1	35·5	37·6	39·7	41·6	43·3	45·0	46·2	47·3	48·1	48·5	48·6
Ven.	8·8	21·1	33·3	45·7	57·9	70·2	82·1	94·1	106·1	118·1	129·9	141·9	153·6	165·1	176·9	188·0	199·1	209·9
Sat	166·4	165·7	165·0	164·4	164·1	163·8	163·6	163·8	164·0	164·3	165·1	165·9	166·6	167·7	168·8	169·9	171·1	172·3
Eng date	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1835 Mars	87·7	92·4	97·2	102·5	107·8	113·3	118·9	124·6	130·6	136·6	142·6	148·7	155·0	161·5	167·9	174·5	181·0	187·7
Merc.	333·1	347·6	5·0	23·8	42·8	61·3	78·0	91·3	97·6	94·4	87·6	89·1	99·7	114·5	131·6	149·4	167·1	183·7
Jup.	46·4	48·5	50·6	52·8	54·8	57·4	59·8	62·1	64·4	66·8	69·1	71·2	73·3	75·1	76·9	78·6	80·1	81·2
Ven.	316·7	328·2	340·0	351·9	3·9	15·8	27·6	39·5	51·6	63·8	78·9	87·8	99·9	112·3	124·5	130·9	149·3	161·6
Sat.	179·4	178·6	177·8	177·1	176·6	176·2	175·7	175·7	175·8	175·8	176·3	176·8	177·5	178·4	179·3	180·2	181·4	182·6
1836 Mars	333·3	341·2	348·9	356·6	4·1	11·7	19·0	26·4	33·7	40·7	47·7	54·3	61·1	67·8	74·0	80·3	86·3	92·1
Merc	342·6	0·8	19·7	38·4	55·7	70·0	77·9	76·9	69·7	69·3	79·0	92·9	109·8	126·5	146·1	163·2	178·7	190·0
Jup.	75·0	76·3	77·9	79·6	81·5	83·5	85·6	87·8	90·1	92·4	94·6	96·9	99·3	101·4	103·6	105·7	107·7	109·4
Ven.	42·0	53·1	64·0	74·5	83·9	90·1	100·7	106·7	109·8	109·7	105·5	98·8	94·7	93·6	95·9	101·4	108·8	117·1
Sat.	192·0	191·2	190·4	189·6	189·0	188·5	187·8	187·6	187·5	187·2	187·5	187·9	188·0	188·8	189·9	190·7	191·8	192·9
1837 Mars	109·7	112·3	115·7	119·8	124·1	128·9	133·8	139·3	144·8	150·4	156·3	162·2	168·7	174·9	181·5	188·1	194·5	201·5
Merc.	357·1	15·4	33·.	48·2	57·9	59·0	52·0	49·5	57·3	71·2	87·9	105·9	124·3	142·1	158·2	171·2	177·6	174·5
Jup.	105·0	105·4	106·0	107·0	108·2	109·6	111·3	113·1	115·0	117·1	119·3	121·4	123·6	125·8	128·0	130·2	132·4	134·5
Ven.	349·9	2·6	14·9	27·3	39·6	51·8	64·1	76·6	88·5	100·6	113·1	125·8	137·4	149·4	161·8	174·0	186·1	198·2
Sat.	204·3	203·5	202·7	202·0	201·3	200·6	199·8	199·5	199·1	198·7	198·8	199·0	199·2	199·8	200·5	201·0	202·0	203·0
1838 Mars	348·7	357·4	4·8	12·4	19·9	27·4	34·4	41·7	48·7	55·9	62·6	69·2	76·0	82·4	89·0	95·2	103·3	107·5
Merc.	10·9	26·6	37·6	40·1	33·9	30·0	36·0	49·1	65·5	83·5	102·2	120·5	137·4	151·6	159·8	159·7	152·1	150·2
Jup.	137·1	136·4	136·1	136·1	136·4	137·1	138·0	139·1	140·4	142·1	143·8	145·7	147·7	149·8	151·9	154·1	156·3	158·5
Ven	319·7	325·9	333·8	342·7	352·6	3·1	13·4	24·8	36·0	47·7	59·4	71·0	82·8	94·6	106·6	118·9	131·1	143·4
Sat.	216·2	215·5	214·8	214·0	213·2	212·4	211·2	211·2	210·7	210·2	210·1	210·0	210·0	210·4	210·9	211·4	212·8	213·2

Mesh.	Vrish.	Mith.	Kat.	Sim.	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum	Min	Asvn	Bhar	Krit	Rohi	Mrig.	Ardh.	Punar.	Push.	Asles
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

V-B—*cont*.

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
249·6	256·5	263·7	270·9	278·3	285·6	293·1	300·7	308·3	**1827**	315·8	323·3	330·9	338·3	345·8	353·2	0·4	7·9	15·0	22·2
168·1	184·7	202·8	219·5	234·3	244·7	247·4	241·4	236·0		240·2	251·5	267·4	283·8	301·9	320·1	336·4	350·4	358·8	357·9
157·4	159·6	161·6	163·6	165·5	167·1	168·6	170·0	171·0		172·0	172·5	172·7	172·6	172·1	171·5	170·4	169·3	168·0	166·8
220·0	230·0	238·8	246·5	253·2	255·9	256·0	252·4	248·2		243·4	242·6	245·9	251·7	259·1	267·9	277·8	288·4	299·2	310·4
76·8	76·8	76·7	76·7	76·0	75·4	74·9	74·0	73·1		72·3	71·6	70·9	70·1	69·8	69·6	69·8	69·7	70·0	70·4
																Mr. 6	Mr 16	Mr 26	Ap 5
144·7	150·9	157·1	163·2	169·4	175·5	181·6	187·7	193·7	**1828**	199·8	205·6	211·4	217·2	222·9	228·4	233·9	239·0	243·9	248·5
182·1	199·2	214·6	226·7	231·9	228·2	221·1	222·1	232·0		246·3	263·9	280·7	298·3	315·2	329·6	339·3	340·4	333·6	330·6
181·0	183·2	185·3	187·5	189·7	191·8	193·7	195·6	197·3		198·9	200·4	201·3	202·2	202·7	202·9	202·8	202·5	201·8	200·8
173·5	186·0	198·7	211·0	223·5	236·0	248·7	261·4	274·0		286·4	299·0	311·5	323·8	336·0	348·4	0·3	11·8	24·1	35·8
90·8	91·0	91·1	91·3	91·0	90·6	90·2	89·4	88·6		87·9	87·1	86·3	85·4	84·9	84·5	83·9	83·9	83·9	84·0
O 7	O 17	O 27	N 6	N 16	N 26	D 6	D 16	D 26		Ja 5	Ja 15	Ja 25	F 4	F 14	F 24	Mr 6	Mr 16	Mr 26	Ap 5
275·9	281·7	287·8	294·4	300·9	307·7	314·3	321·1	328·2	**1829**	335·0	342·1	349·1	356·0	2·9	9·8	16·5	23·4	30·1	37·0
194·9	208·2	215·9	214·8	206·9	204·7	212·9	226·2	242·2		259·5	277·0	294·0	309·3	320·2	323·3	317·4	312·4	316·7	329·0
204·7	206·7	208·8	211·1	213·3	215·5	217·7	219·9	222·0		224·1	226·0	227·7	229·3	230·8	232·0	232·9	233·6	233·9	233·9
127·8	137·4	148·6	159·0	171·3	182·4	194·3	206·5	218·7		231·0	243·2	255·7	268·2	280·6	293·2	305·5	318·0	330·5	342·8
104·1	104·5	105·0	105·4	105·3	105·2	105·1	104·5	103·9		103·2	102·3	101·5	100·6	100·0	99·3	98·6	98·4	98·1	97·9
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
156·8	163·3	169·6	174·0	182·5	188·9	195·2	201·7	208·2	**1830**	214·7	221·3	227·8	234·3	240·9	247·5	254·1	260·6	267·2	273·8
198·7	200·0	193·1	189·0	194·6	206·4	221·5	238·8	256·2		273·4	288·9	301·0	306·1	301·5	295·0	297·6	308·2	323·4	340·9
229·6	231·4	233·4	235·5	237·6	239·9	242·1	244·8	246·7		248·9	251·1	253·3	255·3	257·3	259·2	261·0	262·6	263·9	264·8
209·9	221·7	233·6	245·6	257·2	268·7	279·9	290·8	301·0		310·8	319·1	326·1	330·9	332·4	330·0	324·8	319·6	317·2	318·1
116·6	117·4	118·1	118·8	118·9	119·1	119·3	118·1	118·4		118·0	117·3	116·6	115·8	115·0	114·2	113·3	112·8	112·4	111·8
327·1	327·4	328·8	331·1	334·6	338·3	342·7	347·6	352·6	**1831**	358·0	3·7	9·5	15·2	26·3	27·2	33·4	39·4	45·7	51·9
179·3	173·2	176·3	177·0	201·6	218·4	235·6	252·8	268·7		281·8	288·9	286·7	279·4	279·0	287·6	301·8	318·9	337·2	355·7
257·4	258·7	260·3	261·9	263·6	265·6	267·7	269·9	272·0		274·4	276·7	279·1	281·4	283·8	286·0	288·2	290·3	292·3	294·3
155·1	167·4	180·2	192·3	204·8	217·4	230·0	242·6	255·4		268·1	280·6	293·1	305·9	318·3	330·8	343·3	355·8	8·1	20·8
128·9	129·8	130·6	131·5	132·0	132·4	132·8	132·7	132·5		132·3	131·6	130·9	130·3	129·5	128·7	127·9	127·3	126·6	126·0
																Mr 6	Mr 16	Mr 26	Ap 5
168·9	175·5	182·1	188·7	195·3	202·1	208·7	215·6	222·4	**1832**	229·3	236·3	243·3	250·[illegible]	257·5	264·7	272·0	279·2	286·6	293·9
158·2	167·2	181·7	197·9	215·2	232·4	248·7	262·6	271·5		271·6	264·5	261·6	267·8	281·1	297·2	315·3	333·6	351·7	8·2
289·8	290·0	290·5	291·3	292·5	293·7	295·3	297·0	299·6		301·3	303·1	305·8	308·1	310·4	312·9	315·3	317·7	320·1	322·4
172·3	167·0	164·8	166·5	171·3	178·5	187·1	196·8	207·1		218·0	229·4	240·8	252·7	264·5	276·6	288·8	300·9	312·9	325·2
140·6	141·6	142·6	143·6	144·6	145·0	145·5	145·6	145·7		145·7	145·3	144·9	144·1	143·6	142·8	142·1	141·3	140·6	139·8
																Mr 7	Mr 17	Mr 27	Ap 6
42·5	42·6	41·6	39·8	36·8	34·1	31·6	30·3	30·2	**1833**	31·1	33·1	35·7	39·2	43·1	47·4	52·1	57·1	62·3	67·7
161·3	177·4	194·6	212·0	228·5	243·2	253·9	256·4	250·3		245·3	249·5	260·8	276·[illegible]	293·4	311·6	329·5	346·4	0·6	9·4
327·8	327·0	326·2	325·8	325·6	326·0	326·6	327·5	328·8		330·3	332·2	333·8	335·9	338·1	340·3	342·7	345·1	347·5	349·8
192·7	205·1	217·4	229·8	242·2	254·5	266·9	279·1	291·5		303·5	315·2	327·1	338·8	350·0	0·7	10·8	20·7	29·5	36·8
152·0	153·1	154·8	155·3	156·0	156·8	157·6	157·9	158·3		158·6	158·3	158·1	157·9	157·2	156·6	155·9	155·1	154·3	153·4
181·4	188·1	194·7	201·7	208·6	215·5	222·5	229·6	236·8	**1834**	244·1	251·4	258·8	266·3	273·9	281·3	289·1	296·7	304·4	312·2
178·1	190·7	208·6	223·8	236·0	240·7	237·4	230·2	231·2		241·2	255·5	272·1	289·0	307·8	325·0	339·6	349·8	351·1	344·4
9·8	7·9	6·5	5·3	4·1	3·1	2·5	2·2	2·2		2·7	3·3	4·4	5·6	7·2	9·0	10·8	13·0	15·2	17·4
138·4	150·1	162·3	174·5	186·9	199·1	211·5	224·0	236·8		249·2	261·9	274·6	286·9	299·7	312·2	324·8	337·3	349·7	2·1
162·8	163·9	165·1	166·2	167·2	168·2	169·1	169·6	170·1		170·6	170·6	170·7	170·6	170·1	169·6	169·1	168·3	167·6	166·8
77·4	81·7	85·3	88·4	90·2	91·2	91·0	89·1	86·4	**1835**	83·0	78·9	76·3	74·1	73·5	74·2	76·1	78·5	81·9	85·8
188·1	201·2	217·4	224·7	223·6	215·8	214·2	221·5	235·4		251·5	268·8	286·6	303·8	319·0	330·1	333·5	327·7	322·5	326·9
48·4	47·8	46·9	45·8	44·6	43·3	41·8	40·7	39·6		38·7	38·4	38·0	38·3	38·8	39·7	40·8	42·1	43·6	45·4
220·1	229·9	238·5	245·8	252·2	253·8	253·0	248·4	244·5		240·0	240·3	244·5	250·0	258·5	267·3	277·7	288·6	299·5	310·6
173·4	174·6	175·8	177·7	178·1	180·1	180·2	180·8	181·5		182·3	182·5	182·7	182·8	182·5	182·2	181·9	181·1	180·4	179·8
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 6	Mr 16	Mr 26	Ap 5
196·6	201·5	208·4	215·3	222·3	229·4	236·7	244·1	251·5	**1836**	259·3	266·9	277·5	282·2	290·0	298·0	305·5	313·5	321·5	329·2
198·4	207·8	209·1	201·6	198·0	203·2	215·6	231·1	248·1		265·5	282·8	298·4	310·6	315·9	311·9	305·4	307·2	318·4	333·5
82·1	82·4	83·1	82·9	82·5	81·7	80·5	79·5	78·2		77·0	75·7	74·6	73·5	72·9	72·6	72·5	72·7	73·4	74·4
174·1	186·7	199·4	211·6	224·1	236·6	249·3	262·0	274·6		287·0	299·6	312·1	324·4	336·5	349·0	0·9	12·5	24·6	36·3
183·8	185·0	186·2	187·4	188·5	189·6	190·7	191·5	192·3		193·2	193·6	194·1	194·5	194·3	194·2	194·1	193·5	192·9	192·4
																Mr 7	Mr 17	Mr 27	Ap 6
97·7	103·3	108·1	112·7	116·9	120·7	123·8	125·7	126·6	**1837**	126·8	125·5	122·7	119·4	118·2	112·0	109·1	107·7	107·5	108·8
193·8	188·6	182·5	185·4	196·4	211·0	227·3	244·9	262·1		278·1	291·2	298·3	296·3	288·9	288·4	297·7	311·3	328·9	347·3
111·1	112·4	113·6	114·6	115·2	115·6	115·6	115·3	114·6		113·7	112·6	111·3	110·0	108·7	107·5	106·5	105·7	105·2	105·1
127·3	137·5	148·6	159·4	171·4	182·9	194·7	207·0	219·2		231·5	243·8	256·2	268·7	281·2	293·8	306·1	318·6	331·1	343·4
194·0	195·2	196·4	197·5	198·7	199·7	201·0	201·8	202·2		203·8	204·4	205·0	205·6	205·6	205·8	205·9	205·4	205·0	204·5
208·5	215·3	222·6	229·7	236·9	244·6	252·9	259·6	267·2	**1838**	275·0	282·8	290·5	298·4	306·2	314·1	321·9	330·0	337·8	345·6
167·4	167·2	176·9	190·7	207·0	224·4	241·5	259·0	271·8		280·6	281·2	273·7	270·9	277·7	290·8	307·0	325·0	343·6	1·6
136·5	138·6	140·4	141·9	143·7	144·6	145·5	146·2	146·7		146·7	146·3	145·8	144·9	143·8	142·5	141·3	139·9	138·6	137·9
210·3	222·1	234·0	246·0	257·6	269·0	280·1	290·9	301·0		310·6	318·6	325·8	329·6	330·3	327·0	321·3	316·4	314·8	316·8
204·0	205·2	206·4	207·5	208·7	209·9	211·0	212·0	213·1		214·1	214·8	215·5	216·3	216·6	216·8	217·2	217·0	216·7	216·5
113·8	119·4	124·6	130·2	135·4	140·2	145·0	149·0	152·0	**1839**	155·4	157·6	158·6	158·6	157·2	154·2	150·6	146·7	143·4	141·2
157·5	170·7	186·8	203·9	221·3	237·7	252·5	263·1	265·6		259·6	257·4	258·6	270·3	285·7	303·0	321·3	339·4	356·6	11·1
160·7	162·8	164·9	166·9	168·9	170·7	172·2	173·7	174·9		175·8	176·5	176·7	176·9	176·5	175·9	175·0	173·9	172·8	171·4
155·7	168·0	180·6	192·9	205·4	218·0	230·6	243·2	256·0		268·8	281·2	293·7	306·5	318·9	331·4	344·0	356·4	8·7	20·9
214·0	215·1	216·2	217·3	218·6	219·9	221·1	222·2	223·3		224·3	225·2	226·0	226·9	227·3	227·7	228·0	228·0	228·0	227·9

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash	Srav	Dan	Satab	P. Bhad.	U. Bhad	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle. Venus, A.D. 1765—A.D. 1999;

	Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1839	Mars	140·2	139·7	140·2	142·1	144·7	148·0	151·9	156·4	161·3	166·6	172·8	178·0	184·0	190·3	196·7	203·2	209·9	217·1
	Merc	16·5	21·5	16·3	10·7	14·4	26·8	42·8	60·9	79·9	98·3	115·9	131·1	141·8	148·6	137·2	132·7	138·0	150·5
	Jup	170·7	169·4	168·3	167·5	166·7	166·3	166·8	166·5	167·2	168·0	169·1	170·4	172·1	173·8	175·7	177·6	179·7	181·8
	Ven	27·3	39·4	51·3	63·3	75·2	86·8	98·2	109·6	120·7	131·4	141·8	151·3	160·2	167·9	173·9	177·8	177·8	174·0
	Sat	227·8	227·2	226·6	226·0	225·2	224·4	223·7	223·0	222·3	221·7	221·4	221·2	221·0	221·2	221·5	221·8	222·5	223·2
1840	Mars	5·3	12·7	19·9	27·3	34·1	41·6	48·8	55·8	62·7	69·3	76·2	83·0	89·2	95·8	102·5	108·8	115·0	120·9
	Merc	358·8	352·0	354·1	5·0	20·3	38·1	56·5	75·3	93·2	110·0	121·4	126·1	121·3	115·4	118·9	130·2	145·3	162·3
	Jup	204·8	203·6	202·4	201·0	199·8	198·6	197·6	196·9	196·5	196·5	196·6	197·3	198·1	199·2	200·6	202·2	203·9	205·9
	Ven.	332·2	344·4	356·5	8·9	21·1	33·3	45·6	57·8	69·7	82·4	94·6	106·9	119·1	131·4	143·2	156·0	168·5	180·7
	Sat.	239·2	238·9	238·5	237·8	237·1	236·4	235·6	234·9	234·2	233·4	232·9	232·5	232·1	232·2	232·3	232·3	232·9	233·5
1841	Mars	187·2	183·9	180·4	178·3	177·0	177·2	178·6	181·0	184·8	188·3	192·9	197·7	203·5	209·3	215·0	221·4	227·9	234·5
	Merc.	334·5	343·3	357·8	15·5	34·2	53·2	71·7	88·5	101·6	106·2	105·0	98·3	99·4	109·7	124·3	141·2	159·0	176·6
	Jup.	238·1	237·8	237·0	236·2	235·0	233·7	232·4	231·1	229·9	228·8	228·1	227·7	227·5	227·7	228·3	229·1	230·3	231·6
	Ven.	38·9	41·9	41·1	36·6	30·6	25·8	25·0	28·2	33·9	41·5	50·3	59·8	70·1	80·8	92·0	103·3	115·0	126·9
	Sat.	250·3	250·0	249·8	249·5	248·8	248·2	247·5	246·8	246·0	245·3	244·6	244·0	214·4	243·3	243·2	243·1	243·4	243·9
1842	Mars	20·1	27·3	34·4	11·6	48·4	55·4	62·1	68·9	75·8	82·4	89·0	95·5	102·0	108·4	115·8	126·1	127·4	133·9
	Merc	336·1	352·9	11·0	30·0	48·8	66·0	80·5	89·1	88·0	80·7	79·9	88·7	102·5	119·7	137·6	155·5	172·5	188·0
	Jup	269·6	270·3	270·7	270·8	270·6	270·0	269·2	268·0	266·7	265·3	264·0	262·7	261·6	260·9	260·8	260·1	260·3	260·8
	Ven.	9·4	21·7	34·0	46·2	58·4	70·8	82·7	94·7	106·6	118·6	130·4	142·4	154·1	165·5	177·4	188·3	199·4	210·2
	Sat.	261·3	261·2	261·2	261·1	260·5	259·9	259·3	258·5	257·7	257·0	256·5	255·7	255·0	254·8	254·5	254·1	254·3	254·5
1843	Mars	237·3	239·2	240·2	240·1	239·0	237·1	233·7	231·6	229·6	228·8	229·9	230·7	233·5	237·1	241·6	246·6	252·2	257·9
	Merc	348·6	7·3	26·0	44·6	58·9	69·1	70·2	63·4	60·5	67·8	81·3	97·8	115·8	134·1	151·8	167·2	180·6	186·9
	Jup.	299·0	300·7	302·3	303·4	304·3	305·0	305·2	305·2	304·7	304·0	303·0	301·8	300·5	299·0	297·7	296·6	295·6	294·9
	Ven	317·0	328·6	340·5	352·4	4·4	16·4	28·1	40·1	52·2	64·4	76·5	88·4	100·5	112·9	125·1	137·5	149·9	162·3
	Sat.	272·1	272·3	272·4	272·5	272·2	271·8	271·4	270·6	269·8	269·1	268·4	267·7	266·9	266·5	265·0	265·4	265·5	265·4
1844	Mars	34·8	41·6	48·4	55·2	61·8	68·6	75·1	81·6	88·0	94·8	101·3	107·5	114·1	120·5	126·7	133·0	139·4	145·9
	Merc.	3·3	21·2	36·9	48·3	51·5	45·2	41·0	46·6	59·3	75·6	93·6	112·2	130·8	147·1	161·3	169·7	169·2	162·2
	Jup	327·2	329·5	331·6	333·5	335·5	337·1	338·4	339·6	340·5	341·0	341·2	341·0	340·5	339·6	338·6	337·3	336·0	334·5
	Ven	42·5	53·5	64·2	74·7	84·0	93·1	100·2	105·8	108·4	107·1	102·1	95·1	91·5	91·4	94·5	100·5	108·4	117·0
	Sat.	283·0	283·2	283·6	283·9	283·8	283·5	283·3	282·7	282·1	281·4	280·6	279·9	279·2	278·5	277·9	277·2	277·0	276·9
1845	Mars	268·0	273·9	279·5	284·7	289·8	294·7	298·9	302·4	305·1	306·9	307·6	306·3	304·4	301·8	299·5	298·2	298·1	299·1
	Merc.	14·8	27·3	32·1	27·7	21·7	25·5	37·3	53·2	71·2	90·0	108·4	125·9	141·0	151·2	153·2	146·7	142·3	148·0
	Jup.	354·9	357·2	359·6	2·0	4·4	6·6	8·6	10·7	12·5	14·0	15·4	16·5	17·2	17·7	17·7	17·4	16·8	15·9
	Ven	350·7	3·2	15·5	28·0	40·2	52·4	64·7	77·3	89·4	101·2	113·8	125·9	138·0	150·0	162·3	174·5	186·6	198·6
	Sat	293·8	294·4	295·0	295·5	295·4	295·5	295·5	295·0	294·5	294·1	293·3	292·5	291·6	290·9	290·3	289·7	289·3	288·9
1846	Mars	49·6	55·9	62·3	68·7	75·0	81·4	87·7	94·0	100·4	106·8	113·1	119·6	125·7	132·2	138·6	145·3	151·3	157·8
	Merc.	12·8	10·2	3·2	4·7	15·5	30·7	48·6	67·3	86·3	103·8	120·1	132·4	136·4	131·7	125·6	128·7	140·0	154·8
	Jup	22·6	24·9	27·3	29·7	32·1	34·5	36·8	39·2	41·4	43·5	45·5	47·4	49·0	50·6	51·7	52·6	53·2	53·4
	Ven	318·3	325·1	333·4	312·5	352·6	3·3	13·9	25·1	36·4	48·1	59·9	71·5	83·3	95·2	107·2	119·5	131·7	144·0
	Sat	304·7	305·4	306·2	306·9	307·1	307·3	307·5	307·2	306·9	306·6	306·9	305·4	304·6	303·8	303·0	302·2	301·7	301·2
1847	Mars	290·3	297·3	304·4	311·5	318·5	325·1	332·3	338·8	345·2	351·4	357·1	2·6	7·5	11·8	15·3	17·9	18·9	18·7
	Merc.	345·5	344·7	353·3	8·2	25·6	44·3	63·4	81·7	98·6	112·0	118·7	115·8	108·7	109·4	119·6	134·0	150·7	168·4
	Jup.	50·2	52·2	54·3	56·5	58·7	60·9	63·4	65·7	68·0	70·4	72·7	74·8	77·0	79·0	80·9	82·5	84·1	85·3
	Ven	27·9	40·0	51·9	63·9	75·7	87·3	98·7	110·0	121·1	131·7	142·0	151·3	160·0	167·4	173·0	175·8	175·4	175·6
	Sat	315·7	316·6	317·5	318·4	318·8	319·4	319·9	319·8	319·6	319·6	319·0	318·5	317·9	317·1	316·3	315·5	314·8	314·1
1848	Mars	64·4	70·3	76·1	82·2	88·3	94·3	100·3	106·5	112·6	118·9	125·2	131·3	137·7	144·1	150·4	157·0	163·3	169·9
	Merc.	332·8	346·0	3·0	21·4	40·5	59·3	76·5	91·0	99·7	98·7	91·7	90·2	99·0	112·8	129·5	147·1	165·0	182·2
	Jup.	78·9	80·1	81·6	83·2	85·0	87·1	89·0	91·2	93·5	95·8	98·0	100·3	102·6	104·7	106·9	109·1	111·1	112·9
	Ven.	332·6	345·0	357·2	9·6	21·7	33·9	46·1	58·0	70·7	83·0	95·1	107·1	119·7	132·0	144·0	156·6	169·1	181·8
	Sat.	326·9	327·9	329·0	330·0	300·7	331·3	332·0	332·2	332·4	332·5	332·1	331·8	331·4	330·7	330·6	329·1	328·3	327·5
1849	Mars	309·2	316·8	324·4	332·1	339·5	347·0	354·3	1·7	9·0	15·8	22·7	29·4	35·6	41·7	47·6	53·0	57·4	62·7
	Merc	340·6	358·7	17·6	36·3	54·2	69·1	79·6	81·0	74·2	71·2	78·5	91·4	107·9	125·3	143·9	161·3	177·3	190·0
	Jup	109·3	109·5	110·0	110·8	112·0	113·3	114·9	116·6	118·4	120·4	122·6	124·8	126·9	129·1	131·4	133·6	135·7	137·9
	Ven.	37·5	39·6	38·1	32·6	26·7	22·8	23·3	27·0	33·1	41·2	50·1	59·9	70·4	81·2	92·2	103·6	115·4	127·1
	Sat	338·1	339·3	340·4	341·6	342·5	343·3	344·3	344·8	345·3	345·6	345·4	345·3	345·2	344·5	343·9	343·3	342·5	341·7
1850	Mars	80·6	85·7	90·9	96·5	101·9	107·9	113·6	119·3	125·4	131·4	137·5	143·8	150·1	156·1	162·9	169·2	175·8	182·5
	Merc	354·9	13·5	31·6	47·4	59·1	62·6	56·8	52·0	57·1	69·8	85·9	103·8	122·2	140·4	156·7	170·8	179·1	178·7
	Jup.	141·7	140·9	140·4	140·1	140·4	140·9	141·7	142·7	144·0	145·4	147·2	149·1	151·0	153·0	155·1	157·3	159·5	161·7
	Ven	10·0	22·3	34·5	46·8	59·2	71·4	83·2	95·4	107·2	119·2	131·2	142·7	154·4	166·1	177·7	188·7	199·6	210·2
	Sat.	349·7	351·0	352·3	353·5	354·6	355·7	356·7	357·4	358·0	358·7	358·8	359·0	359·0	358·6	358·2	357·7	356·9	356·1
1851	Mars	326·7	334·5	342·3	349·9	357·5	5·2	12·5	19·8	27·1	34·3	41·8	48·1	54·6	61·2	67·6	73·7	79·7	85·3
	Merc	9·0	25·4	36·1	44·0	49·1	33·1	36·4	47·8	63·5	81·5	100·2	118·4	135·8	150·8	161·2	163·2	156·7	152·2
	Jup.	175·4	174·1	172·8	172·0	171·2	170·5	170·4	170·5	170·9	171·7	172·7	174·0	175·4	177·2	179·0	180·9	183·0	185·1
	Ven.	317·3	329·2	341·0	352·9	4·7	16·9	28·6	40·6	52·7	64·9	77·0	89·1	101·2	113·4	125·6	138·0	150·4	162·9
	Sat.	1·5	2·8	4·1	5·4	6·6	7·8	9·0	9·8	10·7	11·6	12·0	12·4	12·9	12·7	12·5	12·8	11·7	11·0

Mesh	Vrish	Mith	Kat.	Sim	Kan.	Tul	Vrsch.	Dhan	Mak	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·6	120·0

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 6	Mr 16	Mr 26	Ap 5
228·8	230·8	238·1	245·3	252·9	260·4	268·4	275·7	283·6	**1840**	291·3	299·1	307·0	314·8	322·5	330·4	338·2	345·9	353·6	1·1
166·1	183·2	200·7	217·6	232·9	244·9	249·9	246·0	239·0		240·4	250·6	265·3	281·7	299·6	317·6	334·7	349·8	0·3	2·0
184·0	186·3	188·4	190·5	192·7	194·9	196·9	198·9	200·6		202·2	203·7	205·0	205·9	206·5	207·0	207·1	206·7	206·2	205·3
168·5	163·6	162·2	164·8	170·3	178·0	186·9	196·7	207·2		218·2	229·7	241·1	253·1	265·0	277·1	289·3	301·4	313·5	325·8
223·9	225·0	226·0	227·0	228·2	229·4	230·5	231·6	232·8		233·9	234·9	235·9	236·9	237·5	238·1	238·8	238·9	239·1	239·2
																Mr 7	Mr 17	Mr 27	Ap 6
127·3	133·3	139·0	144·8	150·5	156·2	161·5	166·7	171·9	**1841**	176·5	180·0	185·0	188·3	191·3	193·2	193·9	193·7	191·8	189·2
179·2	197·3	213·3	226·3	233·9	232·5	225·2	223·0	230·7		244·7	260·8	278·5	296·2	313·5	328·8	340·0	344·0	338·8	333·0
207·9	209·9	212·1	214·3	216·5	218·7	220·9	223·2	225·3		227·4	229·4	231·2	232·9	234·5	235·8	236·7	237·6	238·1	238·1
193·2	205·8	218·0	230·5	242·8	255·2	267·5	279·8	292·1		304·0	315·6	327·5	339·2	350·8	0·9	11·2	20·7	29·3	36·0
234·1	235·0	235·9	236·9	238·0	239·1	240·3	241·5	242·6		243·8	244·8	245·8	246·9	247·7	248·5	249·3	249·6	249·7	250·3
241·5	248·6	255·7	263·0	270·4	278·2	285·6	293·3	301·1	**1842**	308·7	316·5	324·2	331·6	339·3	346·9	354·3	1·8	8·8	16·2
193·4	207·6	217·1	217·9	211·0	206·8	212·6	224·9	240·3		257·5	275·0	292·4	308·1	320·5	326·1	321·9	315·6	317·4	328·2
233·2	234·8	236·8	238·9	240·9	243·2	245·4	247·7	250·0		252·3	254·6	256·7	258·9	261·0	262·9	264·8	266·4	267·7	269·0
138·9	150·6	162·8	175·1	187·5	199·8	212·2	224·6	237·2		249·8	262·5	275·2	287·6	300·3	312·8	325·4	338·0	350·8	2·7
244·2	245·2	246·0	246·7	248·0	249·0	250·1	251·3	252·5		253·6	254·7	255·8	257·0	257·8	258·7	259·6	260·1	260·6	261·2
139·9	146·1	152·2	158·3	164·3	170·4	176·2	181·9	188·0	**1843**	193·7	199·4	204·7	209·9	215·1	220·0	224·6	228·9	232·5	235·8
199·2	202·9	197·5	191·7	194·6	205·2	219·9	236·7	254·1		271·4	287·6	300·8	308·0	306·1	298·9	298·5	307·3	321·8	338·9
261·6	262·7	264·0	265·6	267·3	269·3	271·4	273·5	275·5		278·0	280·3	282·8	285·0	287·4	289·7	292·0	294·2	296·2	298·2
220·2	228·9	238·2	245·1	251·1	251·8	250·1	244·1	240·8		236·6	238·1	243·0	250·0	258·0	266·6	277·6	288·7	299·7	310·9
254·7	255·4	256·1	256·9	257·9	258·9	259·9	261·1	262·2		263·4	264·6	265·8	267·0	267·9	268·9	269·9	270·5	271·3	271·8
																Mr 6	Mr 16	Mr 26	Ap 5
264·1	270·6	277·2	284·1	291·2	298·2	305·5	312·7	319·9	**1844**	327·2	334·5	341·8	348·9	356·1	3·1	10·3	17·3	24·3	31·0
165·1	176·6	176·7	186·1	199·9	216·3	233·5	250·9	267·5		281·2	290·4	290·5	283·6	279·8	287·4	300·5	316·8	334·9	353·5
294·5	294·5	294·9	295·6	296·6	297·8	299·3	301·1	302·9		304·9	307·1	309·4	311·7	314·1	316·5	319·0	321·3	323·7	326·1
174·8	187·8	200·0	212·3	224·7	237·3	249·8	262·7	275·3		287·7	300·3	312·6	325·0	337·1	349·6	1·4	13·3	25·2	36·7
265·5	266·0	266·6	267·1	268·1	268·9	269·9	271·1	272·3		273·4	274·6	275·8	276·9	278·0	279·1	280·2	281·0	281·9	282·7
																Mr 7	Mr 17	Mr 27	Ap 6
152·1	158·4	164·7	170·9	177·3	183·7	189·9	196·2	202·7	**1845**	208·9	215·2	221·5	227·7	234·1	240·3	246·5	252·7	258·9	265·0
159·4	166·8	180·0	195·8	213·0	230·4	246·9	261·7	272·8		274·9	268·7	263·8	268·0	279·7	295·3	313·0	331·3	349·5	6·5
333·2	332·1	331·2	330·7	330·4	330·6	331·1	332·2	333·0		334·3	336·0	337·8	339·7	341·9	344·1	346·4	348·8	351·2	353·4
127·2	137·8	148·7	159·9	171·7	183·5	195·2	207·6	219·9		232·1	244·4	256·8	269·4	281·9	294·5	306·9	319·1	331·7	344·1
276·7	277·0	277·4	277·7	278·5	279·4	280·2	281·3	282·4		283·4	284·7	285·9	287·0	288·2	289·5	290·6	291·5	292·4	293·4
301·7	304·9	309·3	313·7	318·9	324·5	330·1	336·0	342·2	**1846**	348·4	355·4	1·0	7·3	13·8	20·1	26·6	33·1	39·5	46·0
159·9	175·4	192·5	209·9	226·8	242·1	254·0	259·0	254·8		248·1	249·8	259·8	274·4	291·4	309·3	327·7	344·7	0·0	10·7
14·3	13·5	12·1	10·7	9·4	8·4	8·7	7·1	7·0		7·2	7·8	8·7	9·8	11·3	12·9	14·7	16·8	18·9	21·1
210·8	222·6	234·4	246·4	257·9	269·4	280·4	291·1	300·9		310·4	318·2	324·5	328·2	328·2	324·1	317·9	313·1	312·5	315·4
288·3	288·5	288·6	288·7	289·4	290·1	290·6	291·6	292·6		293·7	294·9	296·1	297·2	298·4	299·6	300·9	302·0	303·7	304·1
164·2	170·7	177·1	185·7	190·2	197·0	203·4	210·0	216·8	**1847**	223·6	230·5	237·4	244·2	251·3	258·1	265·2	272·2	279·4	286·3
171·4	188·9	206·6	222·5	235·7	242·7	241·3	233·8	232·1		240·2	254·0	270·3	287·9	305·8	323·3	338·9	350·5	354·1	349·1
53·4	52·9	52·2	51·1	49·9	48·6	47·2	45·9	44·8		43·8	43·1	42·8	42·8	43·1	43·8	44·8	46·1	47·6	49·2
156·3	168·6	181·0	193·5	206·0	218·6	231·2	243·8	256·6		269·5	281·8	294·3	307·1	319·5	332·0	344·7	357·0	9·8	21·5
300·7	300·6	300·4	300·3	300·8	301·2	301·7	302·6	303·5		304·3	305·4	306·6	307·7	309·0	310·3	311·5	312·8	314·0	315·1
																Mr 6	Mr 16	Mr 26	Ap 5
17·2	14·8	12·2	9·5	8·7	8·2	8·6	10·4	13·0	**1848**	16·3	20·0	24·2	28·9	33·8	39·1	44·3	49·9	55·8	61·8
186·1	202·6	216·6	226·0	227·0	219·9	216·0	221·7	233·8		249·5	266·7	284·9	301·9	317·8	330·3	336·1	332·7	326·0	327·5
86·4	87·2	87·6	87·6	87·3	86·7	85·8	84·6	83·4		82·0	80·7	79·5	78·4	77·6	77·1	76·9	77·1	77·5	78·4
164·7	160·2	159·6	163·1	169·3	177·5	186·7	196·6	207·8		218·4	230·0	241·4	253·5	265·5	277·6	289·8	301·9	314·1	326·4
313·3	313·1	312·9	312·5	312·7	312·9	313·2	314·0	314·7		315·4	316·5	317·6	318·7	319·9	321·1	322·4	323·6	324·9	326·2
																Mr 7	Mr 17	Mr 27	Ap 6
176·6	183·0	189·7	196·5	203·2	210·2	217·0	224·0	231·1	**1849**	238·3	245·5	252·8	260·0	267·4	275·1	282·4	289·8	297·4	305·2
197·3	208·5	212·0	206·6	200·7	203·2	214·3	229·3	245·8		263·5	280·8	297·1	310·4	318·0	316·4	309·2	308·2	317·5	331·7
114·7	116·3	117·5	118·6	119·4	119·9	119·9	119·8	119·3		118·4	117·4	116·2	114·9	113·6	112·3	111·2	110·2	109·7	109·4
194·0	206·4	218·8	231·2	243·4	255·8	267·9	280·4	292·4		304·5	316·2	325·0	339·4	350·4	1·1	11·0	20·5	28·7	35·1
326·8	326·3	325·8	325·2	325·3	325·3	325·3	325·8	326·3		327·0	328·0	329·0	330·0	331·2	332·4	333·6	334·9	336·2	337·5
66·9	70·1	72·5	74·0	74·3	73·2	70·8	67·7	64·2	**1850**	60·8	58·9	58·2	58·5	60·1	62·5	65·9	69·4	73·8	78·2
195·9	193·1	185·7	186·2	195·3	209·1	225·4	242·7	265·2		276·6	290·6	299·7	300·5	293·2	290·2	297·0	310·0	326·8	345·0
140·2	141·9	143·8	145·5	147·0	148·3	149·5	150·2	150·8		150·9	150·7	150·3	149·6	148·5	147·2	146·0	144·4	143·4	142·2
138·6	151·2	163·2	175·4	187·9	200·2	212·6	225·2	237·9		250·3	263·0	275·5	288·3	300·8	313·5	325·9	338·5	351·0	3·4
340·8	340·1	339·5	338·8	338·5	338·2	338·1	338·4	338·8		339·1	339·9	340·8	341·6	342·7	343·9	345·1	346·1	347·7	348·9
189·3	196·1	202·8	209·9	216·8	224·0	231·2	238·4	245·9	**1851**	253·4	260·7	268·2	276·0	283·6	291·3	299·2	307·0	314·7	322·7
171·3	168·5	176·0	189·2	205·1	222·2	239·4	256·3	271·0		281·4	284·3	278·4	273·2	277·6	289·4	305·1	322·9	341·3	359·5
163·9	166·0	168·1	170·2	172·2	174·0	175·7	177·2	178·5		179·6	180·4	180·8	181·0	180·9	180·4	179·5	178·6	177·4	176·0
219·9	229·6	237·7	244·5	248·3	247·7	246·4	239·9	234·9		233·8	236·2	241·6	249·2	257·0	267·5	278·0	288·9	300·0	311·3
355·4	354·6	353·7	352·9	352·5	352·0	351·7	351·6	351·8		351·9	352·5	353·2	353·8	354·9	355·9	357·0	358·2	359·4	0·7
																Mr 6	Mr 16	Mr 26	Ap 5
90·8	95·7	100·3	104·4	107·9	110·7	112·9	113·7	113·6	**1852**	111·9	109·3	105·6	101·8	98·4	96·0	94·9	95·1	96·5	98·9
157·4	169·4	184·8	201·7	219·1	236·1	251·3	263·8	269·2		264·3	257·4	259·1	269·2	283·9	301·0	319·2	337·6	355·0	10·4
187·2	189·5	191·6	193·8	196·0	198·1	200·3	202·2	204·1		205·8	207·3	208·7	209·8	210·5	211·1	211·3	211·1	210·7	210·0
175·3	187·8	200·3	212·8	225·2	238·0	250·5	263·2	275·8		288·2	300·8	313·1	325·5	337·7	349·9	1·9	13·6	25·5	36·8
10·3	9·5	8·7	7·8	7·2	6·5	5·8	5·7	5·5		5·3	5·7	6·1	6·5	7·4	8·3	9·1	10·3	11·5	12·7

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Śrav.	Dan.	Satab.	P. Bhad.	U. Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

V-B—cont.

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
203·5	209·6	210·7	223·9	231·0	238·3	245·7	253·5	261·0	**1853**	268·7	276·5	284·2	291·9	299·8	307·7	315·6	323·6	331·3	339·3
164·3	181·0	198·4	215·7	231·5	244·5	251·9	250·8	242·5		241·3	249·8	263·2	279·6	297·3	315·5	333·0	348·9	0·9	5·2
211·2	213·2	215·4	217·6	219·8	222·1	224·2	226·5	228·7		230·8	232·7	234·8	236·5	238·1	239·6	240·7	241·6	242·3	242·5
127·4	138·3	149·3	160·4	172·0	184·1	196·0	208·3	220·6		232·7	245·0	257·7	270·1	282·6	295·2	307·6	319·8	332·4	344·8
25·6	24·8	26·1	23·2	22·4	21·7	20·8	20·3	19·8		19·4	19·5	19·7	19·8	20·5	21·2	21·9	23·0	24·1	25·2
107·6	113·5	118·7	124·0	128·8	133·3	137·3	139·9	143·6	**1854**	145·4	146·4	145·7	144·0	141·3	137·3	133·9	130·6	127·8	126·9
177·6	195·8	211·8	225·7	235·1	235·9	228·9	224·8	230·3		243·2	259·0	276·4	294·2	311·5	327·6	340·3	345·7	343·1	336·3
236·9	238·5	240·4	242·4	244·5	246·7	248·9	251·2	253·5		255·7	258·0	260·3	262·5	264·7	266·6	268·5	270·2	271·8	273·1
210·2	222·9	234·9	246·8	258·3	269·6	280·4	291·1	300·7		309·8	317·2	323·1	325·8	324·7	320·3	315·3	310·8	310·8	314·0
40·7	40·1	39·4	38·7	37·8	37·0	36·1	35·5	34·9		34·2	34·0	33·8	33·7	34·2	34·6	34·9	35·9	36·8	37·8
217·5	224·7	231·7	239·1	246·5	254·0	261·6	269·2	277·1	**1855**	284·7	292·7	300·6	308·4	316·2	324·0	332·0	339·8	347·4	355·2
191·6	206·5	217·5	221·0	215·5	209·6	212·5	223·5	238·5		255·3	273·0	290·3	306·7	320·2	327·0	326·6	319·3	318·6	327·3
265·8	266·7	267·9	269·5	271·1	273·0	274·0	277·1	279·3		281·6	283·9	286·3	288·6	291·0	293·4	295·7	297·9	300·0	302·0
156·8	169·1	181·5	194·1	206·5	219·3	231·7	244·4	257·1		270·1	282·5	295·0	307·6	320·0	332·5	345·2	357·5	9·8	22·0
55·6	55·2	54·7	54·2	53·4	52·6	51·7	51·0	50·2		49·4	49·1	48·7	48·2	48·3	48·5	48·7	49·4	50·1	50·8
																Mr 6	Mr 16	Mr 26	Ap 5
122·0	127·9	133·6	139·3	144·8	150·1	155·3	160·1	164·7	**1856**	169·1	172·5	175·6	178·0	179·0	179·4	178·2	175·6	172·0	168·0
199·3	205·2	202·1	194·8	195·0	204·4	218·2	234·5	252·0		269·5	286·1	300·8	309·5	310·2	303·4	300·0	307·0	320·2	336·8
299·6	299·4	299·5	300·1	300·9	302·1	303·4	305·0	306·8		308·8	310·9	313·1	315·5	317·9	320·2	322·7	325·5	327·5	329·8
161·3	158·3	158·1	163·0	169·2	177·3	186·7	196·8	207·5		218·6	230·3	241·9	254·0	266·2	278·1	290·1	302·5	314·6	326·9
70·3	70·1	69·9	69·8	69·1	68·4	67·7	66·8	66·0		65·1	64·5	63·8	63·1	62·9	62·8	62·7	63·2	63·6	64·1
																Mr 7	Mr 17	Mr 27	Ap 6
234·4	241·4	248·7	256·0	263·4	270·8	278·5	286·3	294·0	**1857**	301·8	309·6	317·2	324·9	332·6	340·4	347·9	355·4	3·0	10·8
187·9	180·5	178·1	186·0	198·2	214·3	231·2	248·7	265·4		280·5	291·3	294·0	288·0	282·8	287·5	299·0	314·9	332·8	351·2
338·9	337·7	336·7	335·9	335·5	335·5	335·7	336·5	337·4		338·6	340·1	341·9	343·7	345·7	348·0	350·2	352·6	354·9	357·4
194·5	206·7	219·1	231·6	243·7	255·8	268·6	280·7	292·9		304·7	316·7	328·5	339·8	350·7	1·3	10·1	19·8	30·1	34·0
84·5	84·5	84·5	84·5	84·1	83·7	83·2	82·3	81·5		80·7	79·9	79·2	78·4	78·0	77·6	77·1	77·3	77·5	77·6
135·0	140·9	147·1	153·0	159·0	164·8	170·5	176·3	181·8	**1858**	187·3	192·5	197·2	202·1	208·0	210·5	214·0	217·0	218·9	220·3
161·5	166·8	178·6	194·1	211·0	228·3	245·2	260·6	272·4		277·5	273·6	266·7	268·5	278·6	293·6	310·9	329·0	347·4	5·0
20·4	19·1	17·7	16·3	15·0	13·9	12·9	12·3	11·9		12·0	12·4	13·2	14·2	15·5	16·6	18·3	20·7	22·8	25·0
139·8	152·0	164·0	176·2	188·7	201·0	213·4	226·2	238·6		251·0	263·7	276·4	289·0	301·5	312·7	326·6	339·2	351·7	4·1
98·1	98·4	98·6	99·0	98·8	98·5	98·4	97·7	96·9		96·2	95·4	94·5	93·7	93·1	92·5	91·8	91·7	91·6	91·5
254·3	261·1	268·2	275·4	282·5	290·0	297·3	304·8	312·3	**1859**	319·8	327·2	334·6	342·1	349·5	356·6	3·9	11·1	18·2	25·3
158·9	173·7	190·5	207·7	225·0	240·9	253·8	260·9	259·2		251·7	250·8	258·7	272·8	289·4	307·3	325·5	343·2	359·0	11·8
58·2	58·1	57·4	56·5	55·3	54·0	52·6	51·4	50·1		49·0	48·2	47·7	47·5	47·8	48·2	49·0	50·2	51·5	53·2
220·1	229·6	236·7	243·1	246·0	246·4	242·2	236·4	231·5		231·1	234·8	240·7	248·8	257·9	267·8	278·1	289·2	300·7	311·8
111·0	111·5	112·1	112·7	112·8	112·8	112·8	112·3	111·7		111·2	110·4	109·6	108·9	108·1	107·3	106·5	106·1	105·8	105·4
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 7	Mr 17	Mr 27	Ap 6
147·2	153·6	159·7	166·1	172·1	178·5	184·6	190·7	196·7	**1860**	203·0	209·0	215·2	221·7	227·0	232·9	238·6	244·1	249·6	255·0
169·5	186·0	204·6	221·0	234·9	244·2	244·8	237·6	233·9		240·0	252·5	268·2	285·7	303·6	321·4	337·5	350·6	356·7	354·2
90·6	91·4	91·9	92·3	92·0	91·4	90·8	89·8	88·3		87·2	85·9	84·6	83·5	82·5	81·8	81·5	81·5	81·8	82·5
176·1	188·4	200·9	213·4	226·0	238·6	251·0	264·0	276·7		288·9	301·5	313·8	326·1	338·1	350·3	2·3	14·0	25·9	37·4
123·3	124·1	124·9	125·7	126·0	126·2	126·6	126·4	126·1		125·8	125·1	124·4	123·6	122·9	122·2	121·4	120·8	120·2	119·6
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
283·6	288·7	294·6	300·4	306·8	313·0	319·4	326·3	333·0	**1861**	339·5	346·5	353·2	0·0	6·8	13·4	20·0	26·9	33·5	40·1
184·1	200·7	215·7	226·6	229·9	224·0	218·3	221·9	232·7		247·5	264·9	282·5	299·9	316·4	330·2	338·3	337·1	329·6	329·0
118·3	119·9	121·3	122·4	123·3	124·0	124·2	124·2	123·9		123·2	122·2	121·1	119·8	118·5	117·2	116·0	114·9	114·2	113·8
127·6	138·8	149·5	160·6	172·6	184·6	196·4	208·6	220·9		233·3	245·7	258·1	270·8	283·1	295·6	308·1	320·5	333·1	345·3
135·2	136·2	137·1	138·2	138·7	139·3	139·4	139·7	139·7		139·6	139·1	138·5	138·0	137·2	136·4	135·6	134·9	134·9	133·5
159·4	165·8	172·4	178·7	185·1	191·7	198·2	204·7	211·3	**1862**	217·7	224·5	231·2	238·0	244·6	251·4	258·0	264·8	271·7	278·5
196·3	208·6	214·4	210·7	203·5	204·4	213·6	227·4	243·8		261·4	278·8	295·3	309·9	319·2	320·2	313·2	310·3	317·2	330·3
143·4	145·5	147·4	149·1	150·6	152·0	153·2	154·1	154·8		155·1	155·0	154·7	154·1	153·1	151·8	150·6	149·3	147·9	146·9
211·7	223·4	235·2	247·2	258·8	269·8	280·5	290·8	300·6		309·3	316·2	321·5	323·1	321·3	315·5	310·2	307·5	308·9	312·0
146·8	147·9	149·0	150·0	150·9	151·4	152·2	152·4	152·5		152·8	152·4	152·1	151·8	151·1	150·4	149·6	148·9	148·1	147·3
345·6	342·9	342·4	343·0	344·9	347·5	350·9	354·8	359·1	**1863**	3·9	9·1	14·4	20·0	25·7	31·2	37·3	43·3	49·1	55·1
187·8	186·9	189·4	187·2	194·8	207·5	223·5	240·8	258·2		275·0	289·9	300·6	303·7	297·4	292·5	297·3	308·8	325·1	342·7
167·1	169·2	171·4	173·4	175·5	177·3	179·1	180·8	182·1		183·3	184·2	184·8	185·1	185·1	184·8	184·2	183·1	182·1	180·8
157·6	169·8	182·2	194·8	207·2	219·9	232·3	245·0	257·6		270·6	283·1	295·6	308·9	320·6	333·2	345·7	358·0	10·3	22·5
157·9	159·0	160·4	161·3	162·2	163·0	163·9	164·3	164·7		165·1	165·0	165·0	164·8	164·2	163·6	163·0	162·3	161·4	160·6
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 7	Mr 17	Mr 27	Ap 6
171·5	178·2	184·9	191·5	198·2	205·0	211·7	218·5	226·0	**1864**	232·5	239·5	246·7	253·8	261·1	268·3	275·8	283·2	290·5	298·1
175·3	170·9	176·2	187·9	203·2	220·2	237·5	254·6	269·4		282·1	286·9	282·7	276·3	278·2	288·3	303·2	320·7	339·0	357·5
190·4	192·7	194·9	197·0	199·2	201·4	203·5	205·6	207·5		209·3	210·9	212·3	213·5	214·4	215·1	215·4	215·3	215·2	214·6
156·3	154·6	156·3	161·1	168·2	177·0	186·5	196·9	207·8		218·9	230·7	242·3	254·4	266·9	278·7	290·7	303·0	315·1	327·5
168·5	169·7	170·9	172·1	173·1	174·1	175·1	175·7	176·2		176·9	177·0	177·2	177·3	176·9	176·5	176·1	175·3	174·6	173·8
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
52·8	54·4	55·0	54·7	52·0	49·0	46·0	43·2	41·3	**1865**	40·8	41·4	43·0	45·6	48·8	52·7	56·6	61·4	66·3	71·2
157·6	169·3	183·0	199·7	217·1	234·2	250·2	263·0	270·6		268·3	260·9	260·1	268·4	282·2	299·0	317·1	335·4	353·2	9·1
214·6	216·5	218·7	221·0	223·1	225·3	227·6	229·8	232·0		234·3	236·3	238·2	240·1	241·8	243·3	244·6	245·6	246·3	246·9
195·3	207·7	219·9	232·2	244·5	256·9	269·1	281·5	293·5		305·4	317·0	328·8	340·0	351·0	1·1	11·0	19·9	26·9	32·5
178·9	180·1	181·3	182·6	183·7	184·8	185·9	186·6	187·4		188·2	188·3	188·8	189·1	188·9	188·6	188·5	187·9	187·2	186·6

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Śrav.	Dan.	Satab.	P. Bhad.	U. Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

V-B—cont.

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—cont.

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
203.5	209.6	216.7	223.9	231.0	238.3	245.7	253.5	261.0	**1853**	268.7	276.5	284.2	291.9	299.8	307.7	315.6	323.6	331.3	339.3
164.3	181.0	198.4	215.7	231.5	244.5	251.9	250.8	242.5		241.3	249.8	263.2	279.6	297.3	315.5	333.0	348.9	0.9	5.2
211.2	213.2	215.4	217.6	219.8	222.1	224.2	226.5	228.7		230.8	232.7	234.6	236.5	238.1	239.6	240.7	241.6	242.3	242.5
127.4	138.3	149.3	160.4	172.0	184.1	196.0	208.3	220.6		232.7	245.0	257.7	270.1	282.6	295.2	307.6	319.8	332.4	344.8
25.6	24.8	26.1	23.2	22.4	21.7	20.8	20.3	19.8		19.4	19.5	19.7	19.8	20.5	21.2	21.9	23.0	24.1	25.2
107.6	113.5	118.7	124.0	128.8	133.3	137.3	139.9	143.6	**1854**	145.4	146.4	145.7	144.0	141.3	137.3	133.9	130.6	127.8	126.9
177.6	195.3	211.8	225.7	235.1	235.9	228.9	224.8	230.3		243.2	260.0	276.4	294.2	311.5	327.6	340.3	343.7	343.1	336.3
236.9	238.5	240.4	242.4	244.5	246.7	248.9	251.2	253.5		255.7	258.0	260.3	262.5	264.7	266.6	268.5	270.2	271.8	273.1
210.2	222.9	234.9	246.8	258.3	269.6	280.4	291.1	300.7		309.8	317.2	323.1	325.8	324.7	320.3	315.3	310.8	310.8	314.0
40.7	40.1	39.4	38.7	37.8	37.0	36.1	35.5	34.9		34.2	34.0	33.8	33.7	34.2	34.6	34.9	35.9	36.8	37.8
217.5	224.7	231.7	239.1	246.5	254.0	261.6	269.2	277.1	**1855**	284.7	292.7	300.6	308.4	316.2	324.0	332.0	339.8	347.4	355.2
191.6	206.5	217.5	221.0	215.5	209.6	212.5	223.5	238.5		255.3	273.0	290.3	306.7	320.2	327.0	326.6	319.3	318.6	327.3
265.8	266.7	267.9	269.5	271.1	273.0	274.0	277.1	279.3		281.6	283.9	286.3	288.6	291.0	293.4	295.7	297.9	300.0	302.0
156.8	169.1	181.5	194.1	206.5	219.3	231.7	244.4	257.1		270.1	282.5	295.0	307.6	320.0	332.5	345.2	357.5	9.8	22.0
55.6	55.2	54.7	54.3	53.4	52.6	51.7	51.0	50.2		49.4	49.1	48.7	48.2	48.3	48.5	48.7	49.4	50.1	50.8
																Mr 6	Mr 16	Mr 26	Ap 5
122.0	127.9	133.6	139.3	144.8	150.1	155.3	160.1	164.7	**1856**	169.1	172.5	175.6	178.0	179.0	179.4	178.2	175.6	172.0	168.0
199.3	205.2	202.1	194.8	195.0	204.4	218.2	234.5	252.0		269.5	286.1	300.8	309.5	310.2	303.4	300.0	307.0	320.2	336.8
299.8	299.4	299.5	300.1	300.9	302.1	303.4	305.0	306.8		308.8	310.9	313.1	315.5	317.9	320.2	322.7	325.5	327.5	329.8
161.3	158.3	158.1	163.0	169.2	177.3	186.7	196.8	207.5		218.6	230.3	241.9	254.0	266.2	278.1	290.1	302.5	314.6	326.9
70.3	70.1	69.9	69.8	69.1	68.4	67.7	66.8	66.0		65.1	64.5	63.8	63.1	62.9	62.8	62.7	63.2	63.6	64.1
																Mr 7	Mr 17	Mr 27	Ap 6
234.4	241.4	248.7	256.0	263.4	270.8	278.5	286.3	294.0	**1857**	301.8	309.6	317.2	324.9	332.6	340.4	347.9	355.4	3.0	10.8
187.9	180.5	178.1	186.0	198.2	214.3	231.2	248.7	265.4		280.5	291.3	294.0	288.0	282.8	287.5	299.0	314.9	332.8	351.2
338.9	337.7	336.7	335.9	335.5	335.5	335.7	336.5	337.4		338.6	340.1	341.9	343.7	345.7	348.0	350.2	352.6	354.9	357.4
194.5	206.7	219.1	231.6	243.7	255.8	268.6	280.7	292.9		304.7	316.7	328.5	339.8	350.7	1.3	10.1	19.8	30.1	34.0
84.5	84.5	84.5	84.5	84.1	83.7	83.2	82.3	81.5		80.7	79.9	79.2	78.4	78.0	77.6	77.1	77.3	77.5	77.6
135.0	140.9	147.1	153.0	159.0	164.8	170.5	176.3	181.8	**1858**	187.3	192.5	197.2	202.1	208.0	210.5	214.0	217.0	218.9	220.2
161.5	166.8	178.6	194.1	211.0	228.3	245.2	260.6	272.4		277.5	273.8	266.7	268.5	278.6	293.6	310.9	329.0	347.4	5.0
20.4	19.1	17.7	16.3	15.0	13.9	12.9	12.3	11.9		12.0	12.4	13.2	14.2	15.5	16.6	18.3	20.7	22.8	25.0
139.8	152.0	164.0	176.2	188.7	201.0	213.4	226.2	238.6		251.0	263.7	276.4	289.0	301.5	312.7	326.6	339.2	351.7	4.1
98.1	98.4	98.6	99.0	98.8	98.5	98.4	97.7	96.9		96.2	95.4	94.5	93.7	93.1	92.5	91.8	91.7	91.6	91.5
254.3	261.1	268.2	275.4	282.5	290.0	297.3	304.8	312.3	**1859**	319.8	327.2	334.6	342.1	349.5	356.6	3.9	11.1	18.2	25.3
158.9	173.7	190.5	207.7	225.0	240.9	253.8	260.9	259.2		251.7	250.8	258.7	272.8	289.4	307.3	325.5	343.2	359.0	11.3
58.2	58.1	57.4	56.5	55.3	54.0	52.6	51.4	50.1		49.0	48.2	47.7	47.5	47.8	48.2	49.0	50.2	51.5	53.2
220.1	229.6	236.7	243.1	246.0	246.4	242.2	236.4	231.5		231.1	234.8	240.7	248.8	257.9	267.8	278.1	289.2	300.7	311.8
111.0	111.5	112.1	112.7	112.8	112.8	112.8	112.3	111.7		111.2	110.4	109.6	108.9	108.1	107.3	106.5	106.1	105.8	105.4
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 7	Mr 17	Mr 27	Ap 6
147.2	153.6	159.7	166.1	172.1	178.5	184.6	190.7	196.7	**1860**	203.0	209.0	215.2	221.7	227.0	232.9	238.6	244.1	249.6	255.0
169.5	186.0	204.6	221.0	234.9	244.2	244.8	237.6	233.9		240.0	252.5	268.2	285.7	303.6	321.4	337.5	350.6	356.7	354.2
90.6	91.4	91.9	92.3	92.0	91.4	90.8	89.8	88.3		87.2	85.9	84.6	83.5	82.5	81.8	81.5	81.5	81.8	82.5
176.1	188.4	200.9	213.4	226.0	238.6	251.0	264.0	276.7		288.9	301.5	313.8	326.1	338.1	350.3	2.8	14.0	25.9	37.4
123.3	124.1	124.9	125.7	126.0	126.2	126.6	126.4	126.1		125.8	125.1	124.4	123.6	122.9	122.2	121.4	120.8	120.2	119.6
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
283.6	288.7	294.6	300.4	306.8	313.0	319.4	326.3	333.0	**1861**	339.5	346.5	353.2	0.0	6.8	13.4	20.0	26.9	33.5	40.1
184.1	200.7	215.7	226.6	229.9	224.0	218.3	221.9	232.7		247.5	264.9	282.5	299.9	316.4	330.2	338.3	337.1	329.6	329.0
118.3	119.9	121.3	122.4	123.3	124.0	124.2	124.2	123.9		123.2	122.2	121.1	119.8	118.5	117.2	116.0	114.9	114.2	113.8
127.6	138.3	149.5	160.6	172.6	184.6	196.4	208.6	220.9		233.3	245.7	258.1	270.8	283.1	295.6	308.1	320.5	333.1	345.3
135.2	136.2	137.1	138.2	138.7	139.3	139.4	139.7	139.7		139.6	139.1	138.5	138.0	137.2	136.4	135.6	134.9	134.9	133.5
159.4	165.8	172.4	178.7	185.1	191.7	198.2	204.7	211.3	**1862**	217.7	224.5	231.2	238.0	244.6	251.4	258.0	264.8	271.7	278.5
196.3	208.6	214.4	210.7	203.5	204.4	213.6	227.4	243.8		261.4	278.8	295.8	309.9	319.2	320.2	313.2	310.3	317.2	330.3
143.4	145.5	147.4	149.1	[illegible]	152.0	153.2	154.1	154.8		155.1	155.0	154.7	154.1	153.1	151.8	150.6	149.3	147.9	146.9
211.7	223.4	235.2	247.2	258.8	269.8	280.5	290.8	300.6		309.3	316.2	321.5	323.1	321.3	315.5	310.2	307.5	308.9	312.0
146.8	147.9	149.0	150.0	150.9	151.4	152.2	152.4	152.5		152.8	152.4	152.1	151.8	151.1	150.4	149.6	148.9	148.1	147.3
345.6	342.9	342.4	343.0	344.9	347.5	350.9	354.8	359.1	**1863**	3.9	9.1	14.4	20.0	25.7	31.2	37.3	43.3	49.1	55.1
187.8	186.9	189.4	187.2	194.8	207.5	223.5	240.8	258.2		275.0	289.9	[illegible]	303.7	297.4	292.5	297.3	308.8	325.1	342.7
167.1	169.2	171.4	173.4	175.5	177.3	179.1	180.8	182.1		183.3	184.2	184.8	185.1	185.1	184.8	184.2	183.1	182.1	180.8
157.6	169.8	182.2	194.8	207.2	219.9	232.3	245.0	257.6		270.6	283.1	295.6	308.9	320.6	333.2	345.7	358.0	10.8	22.5
157.9	159.0	160.4	161.3	162.2	163.0	163.9	164.3	164.7		165.1	165.0	165.0	164.8	164.2	163.6	163.0	162.8	161.4	160.6
	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 7	Mr 17	Mr 27	Ap 6
	178.2	184.9	191.5	198.2	205.0	211.7	218.5	226.0	**1864**	232.5	239.5	246.7	253.8	261.1	268.8	275.8	283.2	290.5	298.1
	170.9	176.2	187.9	203.2	220.2	237.5	251.6	269.9		282.1	286.9	282.7	276.3	278.2	288.3	303.2	320.7	339.0	357.5
	192.7	194.9	197.0	199.2	201.4	203.5	205.6	207.5		209.3	210.9	212.3	213.5	214.4	215.1	215.4	215.8	215.2	214.6
	154.6	156.3	161.1	168.2	177.0	186.5	196.9	207.8		218.9	230.7	242.3	254.4	266.9	278.7	290.7	303.0	315.1	327.5
	169.7	170.9	172.1	173.1	174.1	175.1	175.7	176.2		176.9	177.0	177.2	177.3	176.9	176.5	176.1	175.3	174.6	173.8
	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
	54.4	55.0	54.7	52.0	49.0	46.0	43.2	41.3	**1865**	40.8	41.4	43.0	45.6	48.8	52.7	56.6	61.4	66.3	71.2
	168.3	183.0	199.7	217.1	234.2	250.2	263.0	270.6		268.3	260.9	260.1	268.4	282.2	299.0	317.1	335.4	353.2	9.1
	216.5	218.7	221.0	223.1	225.3	227.6	229.8	232.0		234.3	236.3	238.2	240.1	241.8	243.3	244.6	245.6	246.3	246.9
	207.7	219.9	232.2	244.5	256.9	269.1	281.5	293.5		305.4	317.0	328.3	340.0	351.0	1.1	11.0	19.9	26.9	32.5
	180.1	181.3	182.6	183.7	184.8	185.9	186.6	187.4		188.2	188.3	188.8	189.1	188.9	188.6	188.5	187.9	187.2	186.6

P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash	Śrav.	Dan.	Satab	P. Bhad.	U. Bhad.	Revati.
146.7	160.0	173.3	186.7	200.0	213.3	226.7	240.0	253.3	266.7	280.0	293.3	306.7	320.0	333.3	346.7	360.0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle. Venus, A.D. 1765—A.D 1999;

Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
Eng. date ...	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 15	S 28
1865 Mars ...	74·0	79·6	85·1	90·7	96·5	102·4	108·4	114·3	120·2	126·3	132·5	138·8	145·1	151·5	157·8	164·5	170·9	177·4
Merc.	16·5	25·8	25·5	18·6	16·8	25·2	39·7	56·9	75·3	94·0	112·2	128·7	142·2	148·6	146·4	138·9	136·3	148·1
Jup. ...	247·0	246·8	246·4	245·7	244·8	243·4	242·3	241·0	239·7	238·3	237·5	236·8	236·4	236·4	236·5	237·2	238·1	239·3
Ven ...	34·4	34·8	31·3	22·5	19·5	18·1	20·0	26·1	32·3	40·9	50·2	60·1	70·9	81·7	93·1	104·6	116·5	128·2
Sat. ..	186·2	185·4	184·6	183·8	183·3	182·8	182·2	182·1	182·1	182·0	182·3	182·8	183·3	184·1	185·0	185·9	187·0	188·1
1866 Mars ...	319·9	327·8	335·5	343·2	350·7	356·3	5·9	13·1	20·4	27·5	34·5	39·1	47·8	54·3	60·4	66·5	72·2	77·6
Merc. ..	7·5	1·1	357·3	4·0	17·1	34·1	52·4	71·4	90·2	107·3	121·7	130·7	130·2	123·1	121·1	128·9	142·0	158·3
Jup. ..	277·8	278·8	279·6	280·0	280·1	279·8	279·3	278·3	277·1	275·9	274·7	273·3	272·0	270·9	270·1	269·7	269·5	269·6
Ven. .	11·3	23·7	35·7	48·0	60·3	72·5	84·4	96·4	108·2	120·2	132·2	143·7	155·4	166·9	178·3	189·3	200·0	210·4
Sat. ..	198·6	197·8	197·0	196·3	195·6	194·9	194·3	194·0	193·8	193·4	193·6	193·9	194·2	194·9	195·6	196·3	197·4	198·4
Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1867 Mars ...	92·2	96·4	100·9	105·9	111·2	116·4	122·0	127·5	135·5	139·5	145·3	151·6	157·9	164·1	170·5	177·1	183·9	190·5
Merc. ...	338·6	343·1	355·4	11·6	29·7	48·6	67·6	86·1	100·7	111·2	113·4	106·7	103·1	108·7	121·1	137·4	155·0	172·5
Jup. ...	306·9	308·7	310·5	311·9	313·1	314·0	314·7	314·9	314·9	314·5	313·8	312·9	311·6	310·2	308·9	307·5	306·3	305·4
Ven. ..	318·3	330·0	342·0	353·8	5·9	17·8	29·8	41·8	53·7	66·0	78·9	90·3	102·4	115·1	127·0	139·4	151·8	164·0
Sat. ...	210·7	210·0	209·3	208·5	207·7	206·9	206·2	205·8	205·4	205·0	205·0	205·0	205·0	205·5	206·1	206·6	207·5	208·4
Eng. date ...	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1868 Mars ..	337·0	344·7	352·5	0·1	7·7	15·2	22·7	29·8	37·0	44·1	50·9	57·8	64·6	71·0	77·4	83·6	89·8	95·9
Merc. ...	333·6	349·0	6·7	25·5	44·5	63·0	78·8	91·1	95·3	90·1	84·5	88·9	100·5	116·0	133·3	151·3	169·0	185·8
Jup .	334·9	337·1	339·4	341·5	343·5	345·4	346·9	348·9	349·6	350·4	351·1	351·2	351·1	350·6	349·8	348·6	347·4	346·1
Ven.	43·5	54·2	64·8	74·7	83·7	91·7	97·7	101·0	101·7	97·3	91·0	85·7	83·8	87·1	91·5	99·1	107·6	117·6
Sat. ...	222·5	221·3	221·2	220·6	219·8	219·0	218·2	217·6	217·0	216·4	216·2	216·1	216·0	216·3	216·6	217·0	217·8	218·6
1869 Mars ...	115·5	117·5	120·2	123·8	127·8	132·4	137·3	142·6	148·1	153·7	159·5	165·4	171·9	178·0	184·6	191·1	197·8	204·8
Merc. ...	344·4	2·8	21·8	40·2	57·0	70·2	76·4	73·0	66·3	68·3	79·0	94·3	111·6	129·9	147·8	164·9	179·5	189·5
Jup. .	2·7	5·9	7·5	9·9	12·3	14·5	16·7	18·8	20·7	22·5	24·1	25·4	26·5	27·2	27·6	27·7	27·3	26·7
Ven. .	352·5	5·0	17·5	29·8	41·9	54·4	66·5	78·8	90·9	103·2	115·4	127·7	139·8	151·8	164·1	176·1	188·2	200·2
Sat. ...	233·9	233·6	233·8	232·3	231·5	230·7	230·0	229·3	228·6	227·8	227·5	227·1	226·9	227·1	227·3	227·4	228·1	228·7
1870 Mars ...	353·0	0·6	8·3	15·7	23·1	30·4	37·7	44·9	51·8	58·9	65·6	72·3	78·9	85·5	92·0	98·3	104·5	110·6
Merc. ...	359·0	17·4	34·5	48·7	56·8	55·4	48·2	47·8	57·7	72·4	89·6	107·9	126·2	141·0	159·5	171·3	175·7	170·6
Jup. ..	30·1	32·4	34·7	37·1	39·5	41·8	44·2	46·6	48·8	51·1	53·2	55·2	56·9	58·7	60·1	61·3	62·2	62·8
Ven.	315·8	323·5	332·8	342·5	353·2	4·1	15·0	26·4	37·9	49·7	61·5	73·3	85·3	96·9	109·3	121·4	133·6	145·9
Sat. ..	245·2	244·9	244·6	244·2	243·5	242·8	242·0	241·2	240·4	239·7	239·2	238·7	238·2	238·1	238·0	238·0	238·6	239·1
Eng. date ..	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1871 Mars ...	148·4	147·1	147·2	148·0	150·3	153·0	156·7	161·1	165·6	170·7	176·2	181·9	187·7	193·9	200·3	207·0	213·7	220·6
Merc. ..	12·2	27·3	37·4	36·9	29·7	27·9	36·2	50·2	67·4	85·4	104·1	122·3	138·7	152·1	158·1	156·3	148·7	149·2
Jup. ...	58·0	59·7	61·7	63·8	65·9	68·1	70·5	72·7	75·1	77·5	79·6	81·9	84·2	86·3	88·3	90·2	91·9	93·3
Ven. ...	29·6	41·6	53·3	65·4	77·1	88·5	99·9	110·9	121·5	131·9	141·5	150·7	158·6	164·5	168·1	168·7	164·4	158·2
Sat.	256·2	256·0	255·8	255·7	255·0	254·4	253·8	253·1	252·3	251·5	250·9	250·2	249·6	249·4	249·2	248·9	249·2	249·6
Eng. date ...	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1872 Mars ..	8·5	15·8	23·3	30·3	37·6	44·8	51·6	58·7	65·7	72·3	78·9	85·5	92·2	98·7	105·0	111·4	117·6	123·9
Merc.	15·9	18·5	11·9	8·0	14·6	27·8	45·2	62·9	81·9	101·1	117·5	131·7	140·6	140·5	133·4	130·9	138·7	151·8
Jup. ..	87·0	88·0	89·2	90·7	92·8	94·2	96·0	98·2	100·3	102·5	104·7	107·1	109·3	111·5	113·8	115·9	118·0	120·1
Ven ...	334·6	346·9	359·1	11·4	23·5	35·7	48·0	60·2	72·5	84·8	97·0	109·2	121·7	133·8	146·2	158·4	170·9	183·3
Sat. ...	267·1	267·2	267·3	267·3	266·8	266·3	265·8	265·0	264·2	263·4	262·7	262·0	261·3	261·0	260·6	260·2	260·3	260·4
1873 Mars .	199·6	196·7	193·0	190·2	187·7	186·8	187·1	188·6	191·1	194·6	198·5	203·1	208·5	213·8	219·9	226·0	232·4	239·2
Merc. ...	354·9	349·2	353·3	5·8	21·7	39·9	59·0	77·7	95·5	110·8	121·5	123·8	117·4	113·2	118·5	131·1	146·8	164·0
Jup. ..	118·0	118·0	118·2	118·8	119·7	120·8	122·1	123·8	125·5	127·4	129·4	131·4	133·6	135·8	138·0	140·3	142·5	144·6
Ven. ...	32·6	32·1	28·2	20·2	16·8	15·9	19·0	24·4	31·9	40·9	50·1	60·5	71·0	82·1	93·4	105·1	116·9	128·8
Sat. .	277·9	278·2	278·5	278·7	278·4	278·1	277·8	277·1	276·4	275·1	275·0	274·2	273·4	272·8	272·3	271·7	271·6	271·5
1874 Mars ...	28·4	30·4	37·5	44·5	51·3	58·2	65·0	71·7	78·4	84·9	91·7	98·0	104·5	111·0	117·4	123·7	130·9	136·3
Merc. ...	332·6	343·7	359·3	17·1	36·0	54·9	73·4	89·6	101·7	106·0	100·7	95·3	99·2	110·5	125·7	143·0	160·7	178·4
Jup ..	150·9	149·9	149·1	148·7	148·5	148·7	149·3	150·1	151·1	152·4	154·1	155·8	157·5	159·6	161·6	163·7	165·9	168·1
Ven. ...	11·9	24·3	36·3	48·6	61·0	73·1	85·1	97·2	108·8	120·7	132·7	144·2	155·9	167·6	178·6	189·6	200·1	210·3
Sat. ...	288·9	289·3	289·7	290·2	290·0	289·9	289·8	289·2	288·6	288·1	287·3	286·5	285·8	285·1	284·4	283·1	283·4	283·2
Eng. date .	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1875 Mars ..	245·0	248·3	250·8	252·3	253·3	252·8	251·0	248·7	246·1	243·8	242·5	241·5	243·9	246·3	249·9	254·0	259·1	264·5
Merc. .	337·4	354·6	13·2	32·0	50·6	67·3	80·6	87·3	83·9	77·2	79·0	89·4	103·6	121·4	139·6	157·5	173·8	189·0
Jup. ...	184·8	183·5	182·2	181·1	180·1	179·3	178·8	178·6	178·7	179·3	180·2	181·1	182·5	184·0	185·7	187·4	189·5	191·6
Ven. ...	318·8	330·5	342·5	354·5	6·4	18·3	30·4	42·5	54·2	66·7	78·9	90·9	103·1	115·4	127·7	140·1	152·5	164·9
Sat ...	299·7	300·3	300·9	301·6	301·7	301·8	301·9	301·5	301·1	300·8	300·1	299·4	298·6	297·8	297·0	296·3	295·8	295·3
Eng. date	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1876 Mars ...	37·9	44·6	51·4	58·1	64·8	71·4	77·9	84·4	90·8	97·5	103·8	110·2	116·6	122·9	129·4	134·6	142·0	148·4
Merc ..	350·4	9·3	27·7	45·0	59·3	67·5	66·5	59·2	59·0	69·5	82·5	99·6	117·7	136·1	153·3	169·0	180·7	184·9
Jup.	218·8	217·9	216·7	215·4	214·2	212·9	211·6	210·5	209·8	209·3	209·1	209·3	209·7	210·4	211·6	212·8	214·4	216·0
Ven. ...	43·8	54·8	65·1	74·6	83·5	91·0	96·8	99·3	98·8	93·8	87·4	82·5	81·8	84·8	91·2	98·8	107·8	117·4
Sat. ...	310·6	311·4	312·2	313·1	313·5	313·8	314·1	313·9	313·7	313·6	313·0	312·4	311·7	310·9	310·1	309·2	308·6	307·9
1877 Mars	273·5	279·4	285·7	291·6	297·2	302·9	307·8	312·5	316·5	319·9	322·5	323·5	323·6	321·9	319·4	317·1	315·2	314·3
Merc.	5·3	22·6	37·7	47·3	48·2	41·2	38·9	46·3	60·6	77·4	95·8	114·2	132·2	148·4	161·8	168·2	165·8	158·4
Jup. ...	251·3	251·5	251·1	250·6	249·7	248·6	247·3	246·0	244·6	243·4	242·3	241·5	240·9	240·7	240·8	241·3	242·1	243·2
Ven. ...	353·3	5·8	18·0	30·2	42·8	54·0	67·0	79·4	91·6	103·6	116·0	128·3	140·4	152·4	164·6	176·5	188·6	200·8
Sat. ..	321·6	322·6	323·6	324·6	325·2	325·8	326·3	326·4	326·5	326·5	326·0	325·5	325·0	324·2	323·4	322·7	321·9	321·2

Mesh.	Vrish.	Mith.	Kat.	Sim.	Kan.	Tul.	Vrisch.	Dhan.	Mak.	Kum.	Min.	Aśvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·6	120·0

V-B.—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja. 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
184·0	190·7	197·6	204·5	211·5	218·5	225·5	232·7	240·1	**1866**	247·5	254·7	262·0	269·7	277·3	285·0	292·7	300·3	308·3	316·0
162·7	179·0	196·6	213·6	230·1	244·2	253·3	253·8	246·7		243·8	249·0	261·8	277·8	295·4	313·6	331·4	347·8	0·9	7·9
240·7	242·3	244·1	246·1	248·1	250·3	252·5	254·8	257·1		259·4	261·6	264·0	266·2	268·3	270·4	272·4	274·2	275·8	277·2
140·4	152·4	164·6	176·8	189·1	201·6	214·0	226·7	239·1		252·1	264·8	277·0	289·7	302·1	314·8	327·4	339·8	352·3	4·7
189·3	190·5	191·7	192·5	194·0	195·1	196·3	197·1	198·0		198·9	199·4	199·9	200·5	200·5	200·5	200·5	199·9	199·4	198·9
82·6	87·2	91·2	94·8	97·5	99·2	99·9	99·1	97·3	**1867**	94·3	90·8	86·7	83·8	81·6	81·3	82·1	84·0	86·8	90·2
175·7	193·2	210·1	224·8	235·7	238·5	233·4	227·5	230·9		241·8	257·0	274·1	291·9	309·7	326·5	340·1	348·6	347·8	340·5
270·0	270·9	272·1	273·3	275·0	276·7	278·7	280·8	283·0		285·2	287·5	289·9	292·2	294·6	297·0	299·4	301·6	303·8	305·7
220·0	228·6	235·8	242·7	244·2	243·2	238·5	232·2	228·7		229·2	232·9	239·8	248·2	257·3	267·6	278·1	289·1	300·6	312·0
199·4	200·6	201·8	202·9	204·1	205·3	206·4	207·4	208·4		209·4	210·1	210·7	211·5	211·7	211·9	212·0	211·7	211·4	211·0
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 7	Mr 17	Mr 27	Ap 6
197·2	204·1	211·1	218·3	225·5	232·6	240·1	247·5	255·0	**1868**	262·5	270·1	277·9	285·8	293·4	301·5	309·1	317·0	325·0	332·9
189·9	205·4	218·1	224·5	219·6	211·4	213·8	222·6	236·8		253·2	270·8	288·6	305·3	320·0	329·5	330·6	323·6	320·4	327·2
304·7	304·3	304·3	304·7	305·4	306·3	307·5	309·1	310·8		312·7	314·8	317·0	319·2	321·7	324·0	326·4	328·8	331·2	333·6
176·7	189·0	201·7	214·0	226·7	239·2	251·8	264·4	277·1		289·5	301·9	314·3	326·7	339·7	350·9	2·7	14·6	26·3	37·8
209·3	210·5	211·6	212·8	214·0	215·2	216·3	217·4	218·5		219·5	220·4	221·2	222·0	222·4	222·8	223·1	223·2	223·3	222·7
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	7a 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
101·3	106·9	112·1	116·8	121·5	125·4	129·1	131·6	133·3	**1869**	133·9	133·4	131·8	128·5	125·0	120·8	117·6	115·4	114·5	114·6
198·9	206·8	206·0	198·4	196·4	203·9	216·8	232·8	249·9		267·4	284·3	299·4	310·5	313·4	307·6	302 [illegible]	307·3	319·0	335·0
344·7	343·4	342·2	341·3	340·8	340·5	340·6	341·1	341·9		342·9	344·4	346·0	347·7	349·7	351·8	354·0	356·4	358·8	1·1
127·5	138·6	149·6	161·3	172·9	185·1	197·1	209·8	221·7		233·6	246·2	258·7	271·3	283·8	296·4	308·6	321·2	333·5	346·0
219·4	220·5	221·5	222·5	223·7	225·0	226·1	227·2	228·3		229·5	230·4	231·3	232·2	232·8	233·3	233·9	233·9	234·0	234·0
211·6	218·4	225·6	232·9	240·3	247·8	255·3	263·0	270·6	**1870**	278·4	286·3	294·0	301·9	309·9	317·7	325·6	333·5	341·3	349·2
191·4	184·6	180·2	185·3	197·1	212·3	229·0	246·7	263·9		279·3	291·4	296·6	292·6	285·9	287·7	298·3	313·2	330·7	349·1
25·8	24·6	23·6	22·0	20·6	19·5	18·3	17·5	17·0		16·9	17·2	17·8	18·6	19·8	21·3	22·0	24·8	26·3	28·9
212·1	224·0	235·7	247·6	259·1	270·0	280·8	290·7	300·5		308·7	315·3	319·9	320·8	317·7	311·8	306·6	304·9	307·0	311·8
229·3	230·3	231·3	232·3	233·5	234·7	235·8	236·9	238·1		239·2	240·2	241·2	242·3	243·0	243·1	244·4	244·7	245·0	245·2
116·6	122·4	128·2	133·6	139·0	144·0	148·7	153·2	157·2	**1871**	160·6	163·4	165·3	166·1	165·4	163·5	160·5	156·8	152·9	149·5
164·3	167·1	177·4	192·2	208·8	226·2	243·4	259·3	272·4		279·6	277·8	270·6	269·4	278·2	292·0	308·8	327·0	344·7	3·5
62·9	63·0	62·5	61·7	60·6	59·5	58·1	56·7	55·5		54·3	53·3	52·7	52·3	52·3	52·7	53·4	54·3	55·6	57·1
158·3	170·5	182·9	195·5	207·8	220·5	233·0	245·7	258·2		271·0	283·7	296·2	308·9	321·2	334·0	346·3	358·7	11·0	23·0
239·5	240·4	241·3	242·2	243·3	244·4	245·5	246·7	247·9		249·0	250·1	251·2	252·3	253·2	254·1	254·9	255·3	255·7	256·1
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 7	Mr 17	Mr 27	Ap 6
227·4	234·4	241·7	249·2	256·5	264·3	271·9	279·3	287·2	**1872**	295·0	302·8	310·7	318·4	326·4	334·0	341·7	349·4	357·0	3·8
157·9	172·0	188·3	205·7	223·1	239·4	253·3	262·6	262·8		255·6	252·3	258·7	271·3	287·2	305·0	323·3	341·2	357·9	11·6
94·6	95·5	96·3	96·6	96·7	96·3	95·7	94·8	93·6		92·4	91·1	89·8	88·5	87·4	86·6	86·1	85·9	86·1	86·6
153·5	152·4	154·6	160·3	167·8	176·8	186·5	197·0	208·1		219·3	231·0	242·7	254·8	267·3	279·2	291·2	303·5	315·7	328·1
249·9	250·6	251·3	252·1	253·1	254·1	255·2	256·4	257·6		258·6	260·0	261·3	262·3	263·2	264·1	265·1	265·7	266·3	266·9
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
129·9	136·1	141·9	147·9	153·6	159·4	164·7	170·1	175·5	**1873**	180·4	185·2	189·6	193·6	197·0	199·7	201·9	202·6	202·6	201·0
167·9	184·6	202·6	219·3	234·2	244·8	247·8	242·0	236·3		240·2	251·3	267·3	283·6	301·7	319·7	336·0	350·4	359·1	358·5
121·8	123·5	125·0	126·3	127·3	128·0	128·5	128·6	128·3		127·9	127·0	125·9	124·7	123·4	122·0	120·7	119·7	118·9	118·2
195·8	208·2	220·2	232·7	245·0	257·0	269·7	281·8	293·9		305·7	317·4	329·2	340·2	351·2	1·3	10·8	19·5	26·3	31·1
260·5	261·0	261·6	262·2	263·2	264·2	265·1	266·3	267·5		268·6	269·7	271·0	272·1	273·2	274·3	275·4	276·2	276·9	277·6
245·0	252·8	260·0	267·3	274·8	282·2	289·9	297·5	305·1	**1874**	312·7	320·5	327·8	335·5	342·9	350·3	357·8	5·1	12·3	19·6
181·8	199·0	214·5	226·7	232·2	228·8	221·5	222·8	231·9		246·1	262·6	280·5	298·0	315·0	329·5	339·5	340·9	331·2	330·8
146·8	148·8	150·8	152·6	154·2	155·6	156·9	158·0	158·6		159·2	159·2	159·0	158·5	157·5	156·5	155·3	154·1	152·7	151·4
140·7	152·9	164·9	177·3	189·6	202·6	214·5	227·1	239·5		252·2	264·8	277·3	290·2	302·8	314·8	327·3	339·9	352·4	5·4
271·4	271·8	272·2	272·7	273·6	274·5	275·3	276·1	277·1		277·8	279·0	280·2	281·3	282·4	283·6	284·7	285·8	286·8	287·8
143·6	148·7	155·0	161·0	167·0	173·2	179·3	185·2	191·1	**1875**	197·1	202·9	208·4	214·1	219·6	224·8	229·9	234·6	239·1	243·1
194·7	208·2	216·1	214·8	207·4	204·8	212·9	226·0	242·0		259·2	276·8	293·8	309·2	320·3	323·7	318·0	312·8	316·7	328·9
170·2	172·4	174·6	176·7	178·8	180·7	182·6	184·2	185·7		187·0	188·0	188·7	188·2	189·3	189·1	188·6	187·8	186·7	185·5
219·6	228·2	234·9	240·2	241·6	239·8	233·4	228·2	225·9		227·5	234·2	239·2	248·2	257·4	267·9	278·6	289·7	301·2	312·5
282·9	283·1	283·3	283·6	284·3	285·9	285·8	286·8	287·9		288·9	290·1	291·3	292·6	293·8	295·0	296·1	297·1	298·2	299·2
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 7	Mr 17	Mr 27	Ap 6
270·2	276·5	282·0	289·6	296·4	303·2	310·2	317·2	324·4	**1876**	331·5	336·7	345·8	352·9	359·8	6·9	13·7	20·7	27·6	34·5
198·9	200·4	193·6	189·3	194·5	206·3	221·3	238·5	255·9		273·2	288·7	301·0	306·4	302·1	293·4	297·7	308·1	323·2	340·7
193·7	195·9	198·1	200·2	202·4	204·7	206·8	208·9	210·8		212·7	214·8	215·9	217·3	218·3	219·1	219·6	219·7	219·7	219·1
177·4	187·7	202·2	214·7	227·4	240·0	252·3	265·2	277·7		290·2	302·6	315·0	327·2	339·4	351·6	3·4	15·1	26·8	37·9
294·8	294·8	294·9	294·9	295·4	295·9	296·5	297·5	298·5		299·4	300·6	301·8	302·9	304·1	305·3	306·6	307·8	309·0	310·1
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
154·7	161·2	167·5	173·7	180·3	186·6	192·9	199·3	205·7	**1877**	212·1	218·7	225·0	231·5	237·9	244·4	250·8	257·3	263·6	270·0
179·9	178·6	176·3	186·9	201·4	218·1	235·3	252·5	268·6		281·7	289·1	287·3	279·9	279·1	287·5	301·6	318·6	336·9	355·4
218·0	219·9	222·1	224·2	226·4	228·6	230·9	233·2	235·3		237·5	239·7	241·7	243·6	245·5	247·1	248·4	249·6	250·4	251·2
128·0	138·9	150·1	161·8	173·5	183·5	197·5	210·0	222·4		234·5	246·0	259·4	272·0	284·5	297·1	309·5	321·9	334·3	346·7
307·3	307·1	306·9	306·7	307·1	307·4	307·8	308·6	309·4		310·3	311·4	312·5	313·6	314·8	316·1	317·3	318·6	319·8	321·0
314·7	316·3	319·4	322·7	327·0	331·8	336·6	342·3	347·6	**1878**	353·7	359·6	5·6	11·8	17·9	24·1	30·4	36·6	43·1	49·4
158·3	167·0	181·5	197·6	214·9	232·2	248·5	262·6	271·7		272·1	265·0	261·8	267·7	281·0	297·0	315·0	333·3	351·4	8·1
244·5	246·0	247·7	249·7	251·6	253·7	256·0	258·2	260·5		262·9	265·1	267·4	269·7	272·0	274·0	276·1	278·0	279·7	281·2
212·6	224·4	236·2	248·0	259·3	270·2	280·3	290·7	300·3		308·0	314·4	317·7	317·6	313·7	307·9	305·2	302·1	305·6	310·9
320·4	320·4	319·7	319·2	319·3	319·4	319·6	320·2	320·8		321·5	322·6	323·7	324·7	325·9	327·1	328·3	329·6	330·9	332·1

Mag.	P. Phal	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Śrav.	Dan	Satab	P. Bhad.	U. Bhad.	Revati.
133·3	147·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	348·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle. Venus, A.D. 1765—A.D. 1999 ;

Year	Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ..	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1878	Mars ...	52·7	59·1	65·3	71·7	77·8	84·3	90·5	96·7	103·2	109·4	115·7	122·1	128·3	135·3	141·2	147·6	153·9	160·2
	Merc. ...	15·6	26·9	28·6	22·5	19·2	25·2	38·3	54·8	73·0	91·8	110·2	127·3	141·8	150·1	150·2	142·6	140·7	148·0
	Jup. ...	281·9	283·1	284·0	284·6	284·8	284·7	284·2	283·5	282·5	281·2	280·0	278·6	277·3	276·1	275·2	274·5	274·1	274·2
	Ven. ...	315·2	323·3	332·6	342·1	353·5	4·3	15·3	26·7	38·2	50·4	62·0	73·6	85·6	97·6	109·8	122·0	134·1	146·4
	Sat. ...	333·0	334·1	335·2	336·3	337·1	337·9	338·7	339·0	339·3	339·5	339·3	339·1	338·8	338·1	337·6	336·7	335·9	335·1
	Eng. date .	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1879	Mars ...	294·4	301·7	309·0	316·2	323·3	330·4	337·5	344·3	351·2	357·5	3·7	9·6	15·0	[illegible]	24·8	28·0	30·8	32·3
	Merc. ...	10·8	5·8	0·2	4·3	16·3	32·1	50·4	69·1	88·2	105·0	121·1	132·0	133·9	127·4	123·2	128·7	140·9	156·4
	Jup. ...	310·7	312·7	314·5	316·1	317·5	318·5	319·4	319·9	320·0	319·7	319·1	318·2	317·2	315·9	314·5	313·1	311·8	310·7
	Ven. ...	30·1	42·1	53·9	65·9	77·4	89·0	100·2	111·4	121·9	132·1	141·7	150·4	157·7	163·4	165·6	165·4	160·7	154·9
	Sat. ..	344·3	345·5	346·7	348·0	349·0	350·0	351·6	351·6	352·6	352·6	352·6	352·6	352·6	352·1	351·6	351·0	350·2	349·4
	Eng. date ..	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1880	Mars ...	67·8	73·4	79·2	85·1	91·2	97·2	103·3	109·4	115·5	121·4	127·8	134·0	140·4	146·6	153·1	159·6	165·9	172·6
	Merc. ...	342·0	343·5	354·5	9·7	27·5	46·3	65·4	83·6	99·7	112·0	116·6	111·5	105·5	108·7	120·3	135·5	152·5	170·2
	Jup. .	338·7	341·0	343·3	345·5	347·6	349·5	351·2	352·8	354·1	355·1	355·8	356·1	356·3	355·9	355·2	354·3	353·1	351·7
	Ven. ..	334·7	346·7	359·7	12·0	24·1	36·5	48·6	61·0	73·1	85·4	97·7	109·8	122·3	134·4	146·7	159·0	171·5	183·9
	Sat. ...	356·0	357·3	358·6	359·9	1·0	2·2	3·3	4·1	4·9	5·7	5·9	6·2	6·5	6·2	5·9	5·5	4·8	4·1
1881	Mars ..	313·1	320·6	328·4	336·1	343·0	351·2	358·6	6·0	13·1	20·3	26·9	33·9	40·2	46·5	52·7	58·2	63·5	68·4
	Merc. ...	333·0	347·3	4·8	23·5	42·5	61·1	77·9	91·3	97·9	95·0	88·1	89·2	99·6	114·3	131·3	149·1	166·8	183·7
	Jup. ...	6·5	8·9	11·3	13·6	16·0	18·4	20·6	22·7	24·7	26·6	28·3	29·8	30·9	31·8	32·4	32·5	32·4	32·0
	Ven. ...	30·6	28·1	24·0	17·5	13·8	14·1	18·2	23·8	31·7	40·9	50·4	60·7	71·2	82·8	94·1	105·6	117·5	129·3
	Sat ...	7·9	9·2	10·5	11·8	13·0	14·3	15·6	16·6	17·6	18·6	19·1	19·7	20·3	20·3	20·2	20·1	19·6	19·1
1882	Mars ...	84·2	89·6	94·8	99·8	105·0	110·6	116·5	122·3	128·3	134·3	140·2	146·7	152·7	159·1	165·5	172·2	178·7	185·4
	Merc. ..	342·4	0·5	19·4	38·2	55·5	70·0	78·1	77·4	70·2	69·5	79·1	92·7	109·5	126·4	145·9	163·0	178·6	190·1
	Jup.	33·8	36·1	38·4	40·7	43·1	45·5	47·9	50·2	52·5	54·8	56·9	59·0	60·9	62·6	64·2	65·5	66·5	67·3
	Ven. ...	12·4	24·9	37·0	49·5	63·2	73·6	85·7	97·6	109·9	121·3	133·3	144·6	156·8	168·0	178·8	189·8	200·5	210·1
	Sat. ...	20·2	21·5	22·8	24·2	25·5	26·8	28·1	29·3	30·5	31·6	32·3	33·1	33·9	34·1	34·4	34·7	34·4	34·0
	Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1883	Mars ...	330·3	338·2	346·0	353·7	1·2	8·8	16·1	23·5	30·8	37·9	44·8	51·7	58·2	64·9	71·2	77·4	83·4	89·2
	Merc.	356·8	15·3	32·9	48·1	58·1	59·5	52·6	49·8	57·3	71·0	87·7	105·6	124·0	141·9	158·0	171·2	177·9	175·1
	Jup. ...	62·9	63·5	65·4	67·4	69·5	71·6	74·0	76·2	78·6	80·9	83·2	85·5	87·6	89·9	91·9	93·8	95·6	97·1
	Ven. ...	319·1	331·0	343·0	355·0	6·9	18·8	30·8	43·0	55·1	67·2	80·1	91·5	103·6	115·9	128·2	140·6	153·1	165·4
	Sat. ...	32·5	33·8	35·1	36·5	37·8	39·1	40·5	41·8	43·1	44·3	45·4	46·4	47·6	48·0	48·4	48·9	48·9	48·8
	Eng. date ...	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1884	Mars ..	106·5	108·3	112·1	116·3	120·9	125·8	131·0	136·5	142·0	147·9	153·9	159·8	166·2	172·4	179·0	185·4	192·1	190·0
	Merc. ..	10·7	26·4	37·7	40·6	34·8	30·3	35·9	49·0	65·2	83·3	101·0	120·2	137·2	151·5	160·1	160·2	152·6	150·4
	Jup. ...	91·2	92·0	93·1	94·4	96·0	97·8	99·7	101·7	103·8	106·0	108·2	110·4	112·7	114·9	117·1	119·3	121·4	123·5
	Ven. ...	44·2	55·1	65·1	74·6	83·4	90·2	95·1	97·2	95·5	89·9	84·2	79·6	81·6	83·8	90·6	98·4	107·5	117·9
	Sat. ...	45·4	46·7	48·0	49·2	50·5	51·8	53·1	54·4	55·7	57·1	58·3	59·4	60·6	61·4	62·2	63·0	63·2	63·5
1885	Mars ...	346·8	354·5	2·2	9·6	17·3	24·6	31·9	39·2	46·2	53·1	60·1	66·7	73·5	79·9	86·5	92·7	98·9	105·0
	Merc. ...	16·6	21·9	16·9	11·1	14·5	26·7	42·5	60·6	79·6	98·0	115·7	131·0	141·9	144·0	137·8	133·0	138·0	150·8
	Jup. ...	122·4	122·2	122·3	122·7	123·4	124·5	125·8	127·2	128·9	130·7	132·7	134·7	136·9	139·1	141·2	143·5	145·7	147·9
	Ven. ..	353·8	6·3	18·6	30·9	43·2	55·7	67·6	79·9	92·1	104·3	116·7	128·8	140·9	152·9	165·0	177·0	189·1	201·2
	Sat. ...	58·4	59·5	60·7	61·8	63·1	64·4	65·7	67·0	68·4	69·8	71·1	72·3	73·5	74·5	75·5	76·5	77·0	77·5
1886	Mars ...	133·0	134·1	135·2	137·5	140·4	146·2	148·6	153·1	158·2	163·4	169·2	175·0	181·1	187·4	193·8	200·4	207·1	213·9
	Merc. ...	359·4	352·4	354·2	4·9	20·1	37·9	56·1	79·0	92·9	100·9	121·3	116·4	121·9	115·8	119·0	130·1	145·1	162·2
	Jup. ...	155·5	154·5	153·6	152·9	152·8	152·9	153·1	153·8	154·8	156·0	157·4	159·0	161·0	162·0	164·8	166·9	169·1	171·2
	Ven. ...	314·8	323·1	332·6	343·1	354·1	4·9	15·8	27·2	38·9	50·7	62·4	74·3	86·2	98·1	110·4	122·6	134·8	147·1
	Sat. ...	71·7	72·6	73·5	74·5	75·7	76·9	78·1	79·5	80·9	82·2	83·5	84·8	86·2	87·3	88·4	89·5	90·3	91·1
	Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1887	Mars ...	2·4	10·2	17·4	24·8	32·0	39·1	46·3	53·4	60·3	67·2	73·8	80·5	87·0	93·6	100·0	106·4	112·6	118·8
	Merc. ...	334·6	343·2	357·6	15·3	33·9	53·0	71·5	88·3	101·6	108·5	105·0	98·8	109·6	109·6	124·1	141·0	158·8	176·4
	Jup. ..	189·6	188·2	186·8	185·8	184·6	183·7	183·0	182·9	182·8	183·2	183·9	184·8	186·0	187·0	189·1	190·9	192·8	194·8
	Ven. ...	31·8	42·7	54·8	66·6	77·7	89·5	100·7	111·7	122·2	132·4	141·7	150·2	157·0	161·9	164·3	162·5	156·8	150·6
	Sat. ...	85·2	86·0	86·7	87·3	88·4	89·5	90·6	91·7	93·3	94·4	95·7	97·0	98·4	99·7	101·0	102·2	103·2	104·2
	Eng. date ...	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1888	Mars ...	178·1	174·7	172·0	169·9	169·6	170·6	172·8	175·8	179·4	183·7	188·6	193·7	199·5	205·6	211·5	217·1	224·4	231·1
	Merc. ...	355·9	352·6	10·7	29·7	48·5	65·8	80·4	84·8	88·6	81·3	80·1	88·6	102·5	119·5	137·3	155·2	172·4	187·8
	Jup. ...	223·4	222·5	221·5	220·2	219·0	217·6	216·4	215·2	214·3	213·7	213·4	213·4	213·8	214·4	215·3	216·5	218·0	219·7
	Ven. ...	333·7	34[illegible]·0	0·2	12·7	24·7	37·0	49·3	61·5	73·6	86·1	98·2	110·5	122·9	134·9	147·4	159·5	172·0	184·7
	Sat. ...	99·0	99·4	99·8	100·3	101·2	102·1	102·9	104·1	105·3	106·5	107·9	109·2	110·5	111·8	113·0	114·3	115·4	116·5
1889	Mars ...	17·5	24·7	31·8	38·9	45·9	53·0	59·7	66·5	73·4	80·1	86·9	93·2	99·8	106·1	113·2	118·9	125·1	131·5
	Merc. .	348·3	7·0	25·8	43·4	58·9	69·3	70·7	64·0	60·7	67·8	81·1	97·6	115·5	133·8	151·6	168·9	180·6	187·1
	Jup. ...	255·7	255·9	255·9	255·4	254·7	253·7	252·5	251·1	249·7	248·5	247·3	246·3	245·7	245·3	245·2	245·6	246·2	247·1
	Ven. ...	28·2	23·5	19·8	14·4	1[illegible]·2	12·1	16·8	22·8	31·5	40·7	52·0	61·0	71·9	82·9	94·5	96·0	117·9	129·9
	Sat. ...	112·9	113·0	113·1	113·3	114·1	114·8	115·4	116·5	117·6	118·6	119·9	121·2	122·4	123·7	125·0	126·3	127·5	128·7
	Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1890	Mars ..	230·0	230·8	230·6	229·4	226·9	224·3	221·4	219·5	218·5	218·7	220·3	223·0	226·5	230·9	235·7	241·2	247·1	253·1
	Merc. ...	3·0	21·0	36·8	48·4	51·9	45·8	41·4	46·7	59·1	75·3	93·3	111·9	130·0	146·9	161·2	169·9	169·7	162·7
	Jup. ...	285·9	287·3	288·3	288·1	289·4	289·6	289·3	288·6	287·8	286·7	285·3	284·0	282·6	281·4	280·3	279·5	279·0	278·7
	Ven. ...	13·2	25·5	37·5	50·0	62·1	74·3	86·2	98·3	110·3	121·8	133·5	145·1	156·6	167·9	179·3	189·9	200·2	209·8
	Sat. ...	126·8	126·6	126·4	126·3	126·8	127·2	127·7	128·6	129·5	130·3	131·5	132·7	134·0	135·3	136·6	137·8	139·0	140·2

Mesh.	Vrish.	Mith.	Kat.	Sim.	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

V-B—*cont.*

Mars, A.D 1637—A.D. 1999 ; Mercury, A.D. 1645—A.D. 1999 ; Jupiter, A.D. 1656—A.D. 1999, Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
166·8	178·4	179·8	186·5	193·0	199·9	206·4	213·3	219·9	**1879**	226·9	233·8	240·7	247·7	254·8	261·7	279·0	276·1	283·4	290·8
161·1	177·1	194·3	211·7	228·3	243·1	254·0	256·8	250·8		245·6	249·6	260·7	275·8	293·1	311·3	324·3	346·2	0·6	9·6
274·5	275·1	276·2	277·4	278·9	280·7	282·5	284·5	286·6		288·9	291·3	293·5	295·8	298·3	300·6	303·0	305·3	307·6	309·7
158·7	171·0	183·4	196·4	208·5	221·2	232·7	246·3	259·0		271·8	284·3	296·9	309·6	321·8	334·5	347·0	359·4	11·5	23·5
334·3	333·7	333·1	332·5	332·4	332·3	332·2	332·7	333·2		333·7	334·5	335·4	336·2	337·4	338·6	339·8	341·1	342·4	343·7
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 7	Mr 17	Mr 27	Ap 6
32·5	31·5	29·3	26·6	24·1	22·3	20·8	20·7	22·1	**1880**	24·2	26·9	30·3	34·3	38·9	43·6	48·6	53·9	59·2	64·7
172·7	190·3	206·4	223·6	236·0	241·0	238·0	230·6	231·2		241·1	255·3	271·9	289·6	307·6	324·8	339·6	351·0	351·6	345·0
309·9	309·4	309·2	309·4	309·9	310·7	311·8	313·2	314·8		316·6	318·6	320·8	323·[illegible]	325·4	327·7	330·1	332·5	334·9	337·4
150·2	150·3	153·5	159·6	167·5	176·9	186·4	197·2	208·2		219·7	231·5	243·4	255·4	267·7	279·9	291·9	304·1	316·4	328·8
348·6	347·8	347·1	346·5	345·9	345·5	345·2	345·4	345·7		346·0	346·7	347·4	348·1	349·2	350·3	351·4	352·7	354·0	355·3
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
179·2	186·0	192·6	199·4	206·2	213·2	220·0	227·1	234·2	**1881**	241·4	248·9	256·2	263·5	270·9	278·6	286·2	293·8	301·4	309·2
187·8	204·0	217·4	224·9	224·0	216·3	214·4	221·5	235·2		251·3	268·5	286·3	303·6	318·8	330·2	333·9	328·3	322·9	327·0
350·4	349·0	347·8	346·7	346·0	345·5	345·5	345·8	346·5		347·4	348·6	350·1	351·8	353·7	355·8	358·2	0·3	2·5	4·8
196·2	208·6	221·0	233·3	246·6	257·8	270·1	282·4	294·5		306·3	317·8	329·4	340·4	351·2	1·2	10·6	19·0	25·4	29·6
3·4	2·6	1·8	0·9	0·3	359·7	359·2	359·1	359·0		359·0	359·5	0·1	0·6	1·5	2·4	3·4	4·6	5·8	7·1
73·0	76·9	80·2	82·5	83·8	84·0	82·8	80·3	76·8	**1882**	73·2	70·2	67·9	66·9	67·4	68·8	71·3	74·4	78·2	82·2
198·3	207·9	209·5	202·1	198·2	203·1	215·4	230·9	247·9		265·2	282·6	298·3	310·6	316·2	312·5	305·9	307·3	318·3	333·3
31·2	30·1	28·9	27·6	26·2	24·9	23·7	22·8	22·2		21·9	21·9	22·4	23·1	24·1	25·5	27·0	28·8	30·7	32·8
141·5	153·6	165·6	178·0	190·3	202·8	215·2	227·8	240·4		252·9	265·5	278·8	290·9	303·5	316·0	328·6	341·0	353·1	6·0
18·5	17·7	16·9	16·0	15·3	14·6	13·8	13·4	13·1		12·8	13·0	13·2	13·5	14·4	15·2	15·9	17·0	18·1	19·3
192·2	199·0	205·9	212·9	219·9	227·1	234·3	241·6	249·0	**1883**	256·5	264·2	271·7	279·4	287·2	294·9	302·8	310·6	318·7	326·3
194·1	189·1	182·9	185·5	196·3	210·8	227·1	244·7	261·8		277·9	291·2	298·5	296·8	289·4	288·5	297·6	311·0	328·6	347·1
67·7	67·7	67·4	66·9	66·0	64·8	63·5	62·2	60·8		59·6	58·5	57·7	57·2	57·0	57·2	57·7	58·6	59·7	61·0
219·7	228·0	234·0	239·3	238·9	235·6	229·1	224·2	223·4		225·5	231·4	238·8	247·7	257·3	267·7	278·7	290·0	301·8	313·3
33·6	32·9	32·3	31·5	30·6	29·9	28·9	28·4	27·8		27·3	27·2	27·2	27·2	27·7	28·3	28·9	29·9	30·9	31·9
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 7	Mr 17	Mr 27	Ap 6
94·8	100·0	104·8	109·3	113·1	116·4	119·0	120·4	121·1	**1884**	120·6	118·5	115·6	111·8	107·9	104·8	102·4	101·9	102·4	104·3
167·8	167·1	176·8	190·5	206·7	224·1	241·2	257·8	271·7		280·8	281·7	274·2	271·2	277·6	290·6	306·8	324·7	343·8	1·8
98·3	99·6	100·5	100·9	101·1	101·1	100·5	99·8	98·8		97·5	96·1	94·8	93·5	92·4	91·5	90·8	90·5	90·4	90·9
177·9	190·4	202·8	215·2	227·9	240·5	253·0	265·7	278·2		290·7	303·1	315·4	327·7	339·7	351·9	3·7	15·6	27·3	38·8
48·7	48·1	47·5	47·0	46·2	45·4	44·5	43·8	43·1		42·3	42·0	41·7	41·4	41·7	42·0	42·2	43·0	43·8	44·7
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
205·9	212·8	219·8	226·9	234·4	241·8	249·2	256·3	264·4	**1885**	272·2	279·7	287·7	295·5	303·4	311·3	319·1	326·1	334·9	342·7
157·4	170·5	186·6	203·7	221·1	237·5	252·3	263·1	266·0		260·2	254·7	258·5	270·1	285·5	302·8	321·0	339·1	356·4	11·0
125·4	127·1	128·7	130·0	131·2	132·0	132·7	133·0	132·7		132·4	131·6	130·7	129·4	128·2	126·9	125·6	124·4	123·4	122·6
128·2	139·6	150·6	162·2	173·9	186·1	198·1	209·7	222·7		235·0	247·5	259·9	272·5	285·0	297·6	309·8	322·4	334·8	347·2
63·7	63·4	63·1	63·5	61·9	61·2	60·4	59·6	58·8		57·9	57·4	56·8	56·2	56·2	56·2	56·2	56·8	57·4	57·9
110·8	116·6	122·1	127·4	132·5	137·3	141·7	145·3	148·7	**1886**	151·0	152·7	153·2	152·4	150·0	146·6	143·0	139·2	136·2	134·5
165·8	182·9	200·4	217·3	232·7	244·9	250·2	246·6	239·4		240·5	250·5	264·9	281·4	299·3	317·4	334·4	349·7	0·4	2·5
150·0	152·0	154·0	155·9	157·7	159·2	160·6	161·7	162·6		163·1	163·4	163·3	162·8	162·1	161·2	160·0	158·7	157·5	156·1
213·0	224·9	236·5	248·1	259·7	270·3	280·8	290·6	299·5		307·0	312·9	315·9	316·8	309·6	303·1	299·6	300·2	303·9	310·0
78·0	77·9	77·8	77·8	77·2	76·6	76·1	75·2	74·3		73·5	72·8	72·1	71·3	71·0	70·7	70·4	70·8	71·1	71·4
220·9	228·0	235·2	242·5	249·1	257·5	265·1	272·9	280·6	**1887**	288·3	296·2	304·1	312·0	319·7	327·6	335·5	343·6	350·8	358·5
178·9	197·0	213·1	226·3	234·1	233·0	225·8	223·1	230·5		245·5	260·6	278·2	296·0	313·3	328·7	340·1	344·4	338·9	333·3
173·4	175·6	177·8	179·9	182·0	184·0	185·9	187·7	189·2		190·5	191·7	192·6	193·1	193·4	193·4	192·9	192·3	191·3	190·1
159·4	171·7	184·1	196·7	208·3	221·8	234·3	247·1	259·8		272·5	285·0	297·6	310·2	322·5	335·2	347·7	0·0	12·5	24·1
91·8	92·0	92·2	92·4	92·1	91·8	91·4	90·6	89·8		89·1	88·3	87·5	86·6	86·1	85·6	85·0	85·0	85·0	85·0
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 7	Mr 17	Mr 27	Ap 6
124·9	130·8	136·6	142·3	148·0	153·6	158·9	163·8	168·7	**1888**	173·2	177·2	180·9	183·8	186·0	187·4	187·3	185·9	182·9	179·6
193·2	207·5	217·2	218·4	211·5	207·1	212·6	224·7	240·1		257·3	274·8	292·2	307·9	320·5	326·4	322·5	316·0	317·6	328·1
196·9	199·1	201·3	203·5	205·7	207·9	210·1	212·2	214·1		216·1	217·9	219·5	221·0	222·1	223·0	223·7	224·0	224·1	223·6
147·7	148·4	152·4	158·9	167·4	176·6	186·8	197·5	208·7		220·1	232·0	243·9	256·0	268·2	280·5	292·6	304·7	317·0	329·4
105·1	105·5	106·0	106·4	106·4	106·3	106·2	105·6	105·0		104·3	103·5	102·7	101·8	101·1	100·4	99·7	99·5	99·2	98·9
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
238·3	245·8	252·5	259·8	267·3	274·9	282·4	290·1	297·1	**1889**	305·5	313·3	321·0	328·7	336·2	344·0	351·4	358·9	6·3	13·7
199·8	208·3	198·1	192·1	194·6	205·1	219·7	236·4	253·9		271·2	287·4	300·8	308·2	306·7	299·4	298·7	307·1	321·6	338·6
221·4	223·4	225·5	227·5	229·9	232·0	234·3	236·5	238·8		241·0	243·2	245·3	247·3	249·1	250·9	252·3	253·6	254·6	255·4
196·7	209·1	221·5	233·8	245·9	258·3	270·5	282·7	294·8		306·5	318·0	329·7	340·4	351·3	1·0	10·3	18·3	24·5	27·8
117·6	118·4	119·1	119·8	119·9	120·1	120·3	119·0	119·5		119·1	118·4	117·7	116·9	116·1	115·3	114·4	113·9	113·5	112·9
137·5	143·7	149·8	155·9	161·9	167·7	173·7	179·4	185·2	**1890**	190·8	196·2	201·4	206·6	211·6	215·9	210·1	223·9	226·8	229·1
185·3	177·0	176·8	186·0	199·7	216·0	233·3	250·7	267·2		281·2	290·6	291·0	284·1	279·9	287·4	300·3	306·6	334·6	353·3
248·3	249·8	251·4	253·2	255·2	257·3	259·4	261·8	264·0		266·3	268·6	271·0	273·2	275·5	277·7	279·8	281·7	283·7	285·2
142·1	154·0	166·2	178·6	190·9	203·4	215·8	228·5	241·0		253·7	266·3	278·9	291·5	304·1	316·7	329·2	341·7	354·2	6·6
129·8	130·7	131·6	132·5	133·0	133·4	133·8	133·7	133·6		133·4	132·7	132·0	131·4	130·6	129·8	129·0	128·3	127·6	127·0
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 8	Mr 18	Mr 28	Ap 7
259·7	266·2	273·1	280·1	287·2	294·5	301·8	309·3	316·5	**1891**	323·9	331·3	338·6	346·0	353·2	0·8	7·5	14·5	21·7	28·4
159·6	166·9	179·8	195·6	212·7	230·1	246·7	261·6	272·4		275·3	269·2	264·1	268·1	279·5	295·1	312·6	331·0	349·2	6·3
279·0	279·5	280·3	281·5	282·9	284·4	286·2	288·3	290·4		292·6	294·9	297·2	299·5	301·9	304·3	306·7	309·0	311·3	313·5
219·0	226·6	232·6	235·8	235·3	231·3	225·1	221·1	220·9		224·4	230·5	238·4	247·5	257·5	267·9	279·0	290·3	301·8	313·5
141·5	142·5	143·5	144·5	145·6	145·9	146·5	146·6	146·7		146·7	146·3	145·9	145·5	144·7	143·9	143·2	142·4	141·6	140·8
Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Śrav.	Dan.	Satab.	P. Bhad.	U. Bhad.	Revati.		
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0		

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle. Venus, A.D. 1765—A.D. 1999;

Day of I.S.Y.		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1891	Mars ...	32·1	39·2	45·9	52·7	59·4	66·2	72·9	79·3	85·8	92·4	98·9	105·4	111·8	118·4	124·6	130·9	137·2	143·6
	Merc. ...	14·7	27·4	32·5	28·3	22·1	25·6	37·2	53·0	71·0	80·7	108·2	125·7	140·9	151·4	153·6	147·4	142·6	147·9
	Jup. ...	314·7	316·7	318·5	320·2	321·7	322·9	323·9	324·6	324·8	324·7	324·4	323·7	322·6	321·4	320·1	318·8	317·4	316·2
	Ven. ...	319·9	331·8	345·6	355·6	7·7	19·6	31·7	43·8	55·9	68·0	80·3	92·2	104·0	116·7	129·0	141·4	153·8	166·2
	Sat. ...	140·5	140·1	139·7	139·5	139·7	139·9	140·0	140·7	141·5	142·1	143·2	144·2	145·3	146·5	147·7	149·0	150·3	151·6
	Eng. date ...	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1892	Mars ...	262·9	269·0	274·1	278·4	282·9	286·9	290·1	293·4	294·3	294·5	294·0	290·8	287·3	286·3	284·7	285·2	286·7	289·2
	Merc. ...	13·1	10·8	8·7	4·8	15·3	30·5	48·4	67·1	86·0	103·7	119·8	132·4	137·0	132·5	126·0	128·7	139·9	154·7
	Jup. ...	342·7	345·0	347·3	349·6	351·7	353·7	355·5	357·2	358·5	359·7	0·6	1·1	1·3	1·1	0·6	359·7	358·6	357·3
	Ven. ...	44·6	55·2	65·3	75·4	82·8	89·3	94·0	94·4	91·9	85·7	80·1	77·2	78·3	82·9	89·5	98·3	107·7	117·6
	Sat. ...	154·1	153·5	153·0	152·4	152·3	152·3	152·2	152·7	153·3	153·7	154·6	155·5	156·4	157·5	158·6	159·8	161·1	162·4
1893	Mars ...	47·0	53·3	59·9	66·3	72·7	79·1	85·5	92·0	98·3	104·7	111·1	117·3	123·7	130·2	136·5	142·8	149·3	155·7
	Merc. ...	346·0	344·8	353·2	7·9	25·4	44·0	63·1	81·4	98·5	112·1	119·0	115·8	109·2	109·5	119·5	133·8	150·5	168·2
	Jup. ...	10·2	12·6	15·0	17·4	19·7	21·1	24·4	26·6	28·6	30·6	32·3	33·9	35·3	36·3	37·0	37·3	37·6	37·2
	Ven. ...	354·6	7·1	19·0	31·3	44·0	56·3	68·5	80·7	92·9	105·1	117·5	129·6	141·6	153·7	165·6	177·6	189·8	201·6
	Sat. ...	167·4	166·7	166·0	165·4	165·1	164·8	164·5	164·7	164·9	165·2	166·0	166·8	167·5	168·6	169·7	170·7	171·9	173·1
	Eng date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1894	Mars .	286·7	293·7	300·4	307·4	314·2	320·9	327·4	333·9	339·9	345·9	351·2	356·0	0·2	3·8	6·2	7·4	7·2	5·6
	Merc. ...	332·8	345·8	2·7	21·1	40·2	59·0	76·3	91·0	100·0	99·2	92·1	90·4	98·9	112·6	128·3	146·8	164·8	181·9
	Jup. ...	37·7	39·8	42·0	44·4	46·7	49·1	51·5	53·8	56·1	58·4	60·7	62·7	64·8	66·6	68·2	69·6	70·8	71·6
	Ven. ...	314·3	323·0	332·8	343·3	353·9	5·1	16·4	27·7	39·2	51·3	63·0	74·8	86·8	98·7	110·9	123·2	135·5	147·6
	Sat. ..	180·4	179·6	178·8	178·1	177·6	177·1	176·6	176·6	176·7	176·7	177·2	177·7	178·3	179·2	180·1	181·0	182·2	183·4
	Eng date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1895	Mars ...	61·7	67·8	73·7	79·8	85·9	91·9	98·2	104·4	110·5	116·9	122·9	129·3	135·6	142·0	148·4	154·7	161·4	167·8
	Merc. ...	340·4	358·5	17·3	36·0	54·0	69·3	79·8	81·5	74·8	71·5	78·3	91·2	107·7	125·2	143·6	161·0	177·1	189·9
	Jup. ...	65·8	67·4	69·2	71·1	73·1	75·2	77·5	79·7	82·1	84·4	86·6	89·0	91·2	93·3	95·4	97·4	99·8	100·9
	Ven. ...	31·8	43·1	55·8	66·7	78·4	89·3	100·8	111·8	122·1	132·1	141·4	149·6	156·2	160·6	161·7	158·9	152·9	147·5
	Sat. ...	193·0	192·2	191·4	190·6	190·0	189·4	188·7	188·5	188·4	188·1	188·4	188·7	189·0	189·8	190·7	191·5	192·6	193·7
	Eng. date ...	Ap 11	Ap 21	My 1	My 11	My 21	My 31	Je 10	Je 20	Je 30	Jl 10	Jl 20	Jl 30	Au 9	Au 19	Au 29	S 8	S 18	S 28
1896	Mars	306·0	313·5	321·1	328·5	336·1	343·6	350·9	358·2	5·1	12·2	18·7	25·4	31·7	37·6	43·4	48·5	53·3	57·6
	Merc. ..	354·7	13·2	31·4	47·3	59·2	63·0	57·5	52·3	57·1	69·6	85·6	103·6	121·9	140·2	156·6	170·8	179·3	179·2
	Jup. ...	95·4	96·1	97·0	98·3	99·8	101·5	103·3	105·4	107·4	109·5	111·7	113·9	116·2	118·4	120·7	122·9	124·9	127·1
	Ven. ...	333·4	348·6	0·9	13·4	25·4	37·7	49·8	62·2	74·4	86·8	98·9	111·2	123·4	135·6	148·1	160·2	172·7	185·1
	Sat. ...	205·2	204·4	203·6	202·9	202·2	201·5	200·7	200·4	200·0	199·6	199·7	199·8	200·0	200·5	201·3	201·8	202·7	203·7
1897	Mars ...	77·8	83·0	88·4	94·0	99·7	105·3	111·2	117·2	123·0	129·3	135·4	141·5	147·9	154·2	160·6	167·2	173·6	180·2
	Merc. .	8·8	25·3	38·2	44·5	39·8	33·5	36·5	47·7	63·3	81·3	100·0	118·1	135·6	150·7	161·3	163·6	157·3	152·5
	Jup. ...	126·8	126·5	126·5	126·7	127·4	128·2	129·4	130·8	132·4	134·1	136·1	138·1	140·2	142·3	144·4	146·7	148·9	151·1
	Ven.	25·8	22·1	15·4	10·6	8·8	10·7	15·8	22·9	31·3	40·7	50·8	61·4	72·0	83·3	94·9	106·6	118·5	130·4
	Sat. ...	217·1	216·4	215·7	214·9	214·1	213·3	212·6	212·1	211·5	211·0	210·9	210·8	210·8	211·2	211·7	212·2	213·1	214·0
	Eng. date .	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1898	Mars ...	323·8	331·6	339·4	347·0	354·5	2·1	9·6	16·9	24·1	31·2	38·1	44·9	51·7	58·2	64·4	70·5	76·5	82·0
	Merc. ...	16·7	24·1	21·7	14·7	15·5	25·8	40·9	58·7	77·3	95·7	113·6	129·8	142·3	147·0	142·7	135·8	138·6	149·0
	Jup. ...	160·1	159·0	158·2	157·3	156·9	156·9	157·0	157·7	158·1	159·6	160·9	162·5	164·3	166·1	168·1	170·2	172·3	174·4
	Ven. ...	13·8	26·1	38·4	50·2	62·7	74·7	86·8	98·7	110·5	122·3	134·0	145·6	157·0	168·3	179·3	190·0	200·3	209·7
	Sat. ...	228·7	228·1	227·5	226·9	226·1	225·3	224·6	223·9	223·2	222·6	222·3	222·0	221·8	222·0	222·3	222·6	223·3	224·0
1899	Mars ...	96·9	100·4	104·7	109·5	114·5	119·6	125·2	130·6	136·6	142·4	148·3	154·6	160·8	167·1	173·5	180·0	186·9	193·5
	Merc.	4·1	356·6	355·6	4·0	18·6	35·8	54·2	73·3	91·6	108·6	121·8	129·2	126·5	119·2	119·9	129·0	143·6	160·3
	Jup. ...	194·2	191·9	191·7	190·3	189·1	188·1	187·4	187·0	187·0	187·2	187·7	188·6	189·0	190·9	192·4	194·2	196·1	198·1
	Ven. ...	320·3	332·4	344·2	356·2	8·1	20·2	32·2	44·4	56·0	68·6	80·9	92·8	105·2	117·3	129·3	142·0	154·0	166·3
	Sat. ..	240·1	239·7	239·3	238·7	238·0	237·3	236·5	235·8	235·1	234·3	233·8	233·4	233·0	233·0	233·1	233·1	233·7	234·3
1900	Mars ...	340·6	348·5	356·0	3·7	11·3	18·6	25·9	33·2	40·5	47·5	54·2	61·1	67·7	74·4	80·8	87·0	93·3	99·3
	Merc. ...	336·2	312·6	356·1	13·0	31·6	50·7	69·4	86·8	101·2	110·3	110·3	102·9	100·9	108·7	122·6	138·9	156·6	174·3
	Jup. ...	227·9	227·2	226·2	225·1	223·8	222·4	221·1	219·9	219·0	218·2	217·7	217·6	217·9	218·4	219·3	220·4	221·8	223·3
	Ven. ...	44·7	55·1	65·1	74·3	82·5	88·5	92·2	92·5	88·6	82·3	76·7	74·9	77·0	82·0	89·4	97·7	107·5	117·5
	Sat. ...	251·1	250·8	250·6	250·3	249·7	249·1	248·4	247·7	246·9	246·2	245·5	244·9	245·2	244·1	244·0	243·9	244·3	244·8
1901	Mars ...	121·6	122·9	125·3	128·4	132·1	136·3	141·1	146·1	151·5	157·1	163·0	168·8	175·1	181·2	187·8	194·3	201·1	208·0
	Merc. ...	334·6	350·5	8·6	27·4	48·1	64·3	79·8	90·6	92·5	85·8	82·1	88·6	101·2	117·5	135·0	153·1	170·8	186·7
	Jup. ...	260·0	260·3	260·4	260·1	259·5	258·6	257·4	256·2	254·9	253·5	252·3	251·0	250·4	249·8	249·7	249·9	250·3	251·1
	Ven. ...	355·2	7·6	20·0	32·3	44·2	56·9	69·2	81·3	93·5	105·7	118·1	130·0	142·3	154·3	166·3	178·2	190·3	202·2
	Sat. ...	262·2	262·1	262·1	262·0	261·4	260·8	260·2	259·4	258·6	257·9	257·2	256·6	255·9	255·7	255·4	255·0	255·1	255·4
	Eng. date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1902	Mars ..	356·6	4·0	11·7	19·0	26·4	33·7	40·9	47·9	54·9	61·7	68·7	75·4	82·0	88·5	94·9	101·2	107·4	113·5
	Merc. ...	346·0	4·6	23·5	41·7	57·9	70·2	74·2	68·6	63·2	68·3	79·6	95·6	113·6	131·5	149·4	166·0	180·2	188·8
	Jup. ..	289·9	291·4	292·5	293·5	294·1	294·2	294·2	293·7	293·0	292·0	290·7	289·3	287·9	286·7	285·6	284·6	284·0	283·6
	Ven. ...	313·6	322·6	333·0	343·0	353·9	5·1	16·4	28·3	39·6	51·8	63·8	75·8	87·8	99·8	111·4	123·5	136·1	148·0
	Sat. ...	273·0	273·1	273·3	273·3	273·1	272·7	272·3	271·5	270·7	270·0	269·3	268·6	267·8	267·4	266·9	266·3	266·2	266·2

Mesh.	Vrish.	Mith.	Kat.	Sim.	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·6	120·0

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 7	Mr 17	Mr 27	Ap 6
149·9	156·2	162·3	168·9	174·9	181·3	187·5	193·7	199·9	**1892**	206·1	212·4	218·7	224·8	230·9	237·0	243·2	248·9	254·8	260·5
159·8	175·2	192·2	209·7	226·6	242·0	254·2	259·3	255·4		248·5	249·9	259·7	274·2	291·2	309·1	327·4	344·6	359·9	10·8
315·2	314·5	314·3	314·1	314·5	315·2	316·9	317·4	318·9		320·7	322·6	324·7	326·9	329·1	331·4	333·9	336·3	338·7	344·1
178·7	191·2	203·6	216·2	228·7	241·3	253·8	266·5	279·0		291·5	303·9	316·2	328·3	340·7	352·7	4·3	16·2	27·9	38·8
152·8	153·9	155·8	156·1	156·9	157·7	158·5	158·8	159·2		159·5	159·3	159·1	158·9	158·2	157·6	156·9	156·1	155·3	154·4
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
293·0	297·4	302·3	307·5	313·1	319·1	325·3	331·6	337·9	**1893**	344·3	350·9	357·5	4·0	10·6	17·2	23·7	30·5	36·8	43·3
171·2	188·7	206·4	228·3	235·6	242·9	241·8	234·2	232·3		240·0	253·8	270·1	287·7	305·6	323·1	338·7	350·6	354·7	349·8
356·1	354·7	353·4	352·2	351·3	350·8	350·6	350·7	351·2		352·0	353·1	354·4	356·1	357·9	359·9	2·0	4·3	6·5	8·9
128·5	139·9	150·9	162·7	174·6	186·6	198·8	211·2	223·2		235·8	248·3	260·7	275·3	285·8	298·5	310·6	325·2	335·6	347·2
163·6	164·7	165·9	167·0	168·0	169·0	170·0	170·5	171·0		171·5	171·5	171·6	171·6	171·1	170·6	170·1	169·3	168·6	167·8
162·1	168·6	175·1	181·4	188·1	194·6	201·2	207·7	214·4	**1894**	221·0	227·8	234·6	241·4	248·2	255·1	262·0	269·0	275·9	283·0
185·8	202·4	216·5	226·1	227·4	220·5	216·3	221·7	233·7		249·3	266·5	284·7	301·7	317·7	330·3	336·4	333·8	326·5	327·5
36·6	35·7	34·5	33·2	31·8	30·5	29·2	28·2	27·4		26·9	26·8	27·1	27·6	28·5	29·7	31·1	32·8	34·5	36·6
213·4	225·5	237·0	248·4	259·7	270·5	280·7	290·5	299·1		306·0	311·4	313·0	311·1	304·7	299·7	299·6	298·2	303·2	309·3
174·2	175·4	176·6	177·9	178·9	179·9	181·0	181·7	182·4		183·2	183·4	183·6	183·7	183·4	183·1	182·8	182·1	181·4	180·8
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 8	Mr 18	Mr 28	Ap 7
3·5	0·8	358·4	357·5	357·4	358·5	0·3	3·2	6·6	**1895**	10·5	14·7	19·7	24·9	30·1	35·4	41·1	46·9	52·7	58·5
197·1	208·6	212·3	207·5	201·1	203·3	214·1	228·8	245·6		263·3	280·5	296·9	310·3	318·3	316·9	307·6	308·4	317·5	331·4
72·3	72·4	72·4	71·9	71·2	70·1	68·8	67·4	66·2		64·9	64·7	62·7	62·1	61·8	61·8	62·2	62·8	63·8	65·0
159·9	172·4	184·8	197·3	209·9	222·3	235·1	247·7	260·3		272·9	285·5	290·4	310·8	323·3	336·0	348·4	0·8	13·0	24·6
184·6	185·8	187·0	188·2	189·3	190·4	191·5	192·3	193·1		194·0	194·5	195·0	195·4	195·2	195·1	195·0	194·4	193·8	193·3
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 7	Mr 17	Mr 27	Ap 6
174·2	180·9	187·7	194·4	201·1	207·9	214·7	221·6	228·6	**1896**	235·7	242·9	250·0	257·4	264·7	271·9	279·6	286·9	294·5	302·0
196·2	193·6	186·1	186·3	195·1	208·9	225·2	242·4	260·0		276·4	290·6	299·9	300·9	299·8	299·5	296·9	309·9	326·5	341·7
102·4	103·6	104·5	105·2	105·5	105·6	105·3	104·6	103·7		102·5	101·2	99·9	98·5	97·4	96·3	95·4	95·1	94·8	95·1
145·0	146·7	151·5	158·4	166·6	176·5	186·6	197·8	209·1		220·4	232·5	244·3	256·4	268·6	280·9	293·1	305·3	317·6	330·1
194·8	196·0	197·2	198·3	199·5	200·5	201·8	202·6	203·7		204·6	205·2	205·8	206·4	206·5	206·7	206·8	206·3	205·9	205·4
O 8	O 18	O 28	N 7	N 17	N 27	D 7	D 17	D 27		Ja 6	Ja 16	Ja 26	F 5	F 15	F 25	Mr 7	Mr 17	Mr 27	Ap 6
61·1	63·8	65·4	66·0	65·2	62·9	60·2	56·9	53·9	**1897**	51·7	50·6	51·1	52·5	54·9	57·9	61·6	65·7	70·3	75·2
171·8	168·8	175·9	189·0	204·9	225·9	239·2	256·1	270·9		281·5	287·9	279·0	273·5	277·6	289·3	304·8	322·7	341·0	359·3
129·0	130·7	132·4	133·8	135·1	136·0	136·7	137·1	137·1		136·9	136·3	135·3	134·2	132·9	131·6	130·2	129·0	127·9	127·1
197·4	209·8	222·2	234·5	246·6	259·0	271·2	283·2	295·7		307·6	318·6	330·0	340·8	351·2	1·1	10·0	17·5	23·1	25·8
204·7	205·9	207·1	208·2	209·4	210·6	211·7	212·8	213·9		214·9	215·6	216·8	217·1	217·4	217·6	218·0	217·9	217·6	217·4
186·9	193·7	200·6	207·4	214·4	221·6	228·7	236·0	243·2	**1898**	250·7	257·9	265·6	273·2	280·8	288·5	296·3	304·1	311·9	319·7
157·5	169·2	184·6	205·5	218·8	235·9	251·1	263·3	269·7		264·9	257·8	259·2	269·7	283·7	300·8	318·9	337·3	354·8	10·3
158·2	155·3	157·4	159·4	161·1	162·8	164·2	165·4	166·4		167·0	167·4	167·5	167·3	166·6	165·7	164·7	163·4	162·1	160·8
142·4	154·6	166·7	179·2	191·6	204·0	216·6	227·0	241·7		254·4	267·0	279·6	292·1	304·7	317·3	329·9	312·8	354·7	7·2
214·8	215·9	217·0	218·1	219·4	220·7	221·9	223·0	224·1		225·1	226·0	226·8	227·7	228·1	228·5	228·8	228·8	228·7	228·7
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 8	Mr 18	Mr 28	Ap 7
87·2	92·0	96·6	100·3	103·6	106·0	107·5	107·8	106·9	**1899**	104·3	100·9	97·2	93·6	90·7	89·3	89·0	90·0	92·1	94·9
164·1	180·7	198·1	215·4	231·8	244·5	252·1	250·9	242·3		241·5	249·7	263·0	279·8	297·0	315·2	332·8	348·8	1·0	5·6
176·6	178·9	181·0	183·2	185·3	187·4	189·3	191·0	192·7		194·2	195·3	196·4	197·0	197·5	197·6	197·3	196·8	195·8	194·8
218·5	225·9	231·8	233·7	232·8	227·8	221·6	218·5	219·0		228·3	230·0	238·4	247·7	257·7	268·3	279·5	290·8	302·4	314·0
224·7	225·7	226·7	227·8	229·0	230·2	231·3	232·4	233·6		234·7	235·7	236·7	237·7	238·3	238·9	239·6	239·7	239·9	240·0
200·4	207·3	214·2	221·5	228·6	235·9	243·8	250·7	258·3	**1900**	265·9	273·7	281·4	289·1	297·0	304·8	312·8	320·8	328·5	336·5
177·5	195·0	211·6	225·6	235·2	236·3	229·3	225·1	230·4		243·0	258·8	276·1	293·9	311·3	327·4	340·4	347·0	348·7	336·7
200·2	202·4	204·5	206·7	208·9	211·2	213·3	215·5	217·6		219·5	221·3	223·1	224·6	225·0	226·9	227·7	228·1	228·3	228·2
178·8	191·8	204·2	216·8	229·3	241·9	254·6	267·0	279·7		292·1	304·5	316·6	328·9	341·1	353·1	4·7	16·6	28·1	39·2
234·9	235·8	236·7	237·6	238·9	239·8	241·0	242·2	243·4		244·5	245·6	246·6	247·7	248·5	249·3	250·1	250·4	250·5	251·2
105·1	110·6	115·8	120·8	125·6	129·9	133·6	136·7	139·1	**1901**	140·5	141·1	139·7	137·3	134·0	130·4	126·6	123·5	121·5	121·3
191·4	206·4	217·6	221·4	216·1	210·0	212·5	223·3	238·3		255·0	272·7	290·0	306·5	320·2	328·1	327·7	319·8	318·8	327·2
225·1	227·0	229·0	231·1	233·4	235·5	237·9	240·1	242·4		244·5	246·8	248·9	250·9	252·9	254·7	256·3	257·7	258·8	259·6
128·4	139·9	151·3	163·1	174·1	187·1	199·3	211·5	223·7		235·9	248·8	261·1	273·7	286·2	298·8	311·2	323·6	336·2	348·6
245·1	246·0	246·8	247·5	248·7	249·7	250·8	252·0	253·2		254·3	255·4	256·5	257·7	258·6	259·5	260·4	260·9	261·4	262·0
214·8	221·9	228·9	236·3	243·7	251·1	258·8	266·4	274·0	**1902**	281·9	289·6	297·7	305·5	313·3	321·2	329·1	337·0	344·6	352·3
199·3	205·5	202·6	195·2	195·1	204·3	218·0	234·2	251·7		269·3	285·9	300·3	309·7	310·6	304·0	300·2	307·1	320·0	336·5
252·2	253·5	255·2	256·9	258·9	260·9	263·0	265·3	267·5		269·9	272·1	274·4	276·8	279·1	281·4	283·5	285·5	287·4	289·2
214·0	226·0	237·4	248·8	259·9	270·7	280·5	290·3	298·6		305·0	309·7	310·8	307·8	301·0	296·0	295·5	297·0	301·5	308·6
255·5	256·2	256·9	257·6	258·6	259·7	260·7	261·8	263·0		264·1	265·3	266·5	267·7	268·7	269·6	270·7	271·3	272·1	272·7
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
119·6	125·5	131·2	136·9	142·3	147·5	152·5	157·2	161·4	**1903**	165·4	168·7	171·1	172·9	173·3	172·7	170·4	167·1	163·3	159·5
188·4	181·0	178·4	186·1	197·6	213·8	230·4	248·4	265·2		280·4	291·4	294·4	288·5	287·2	287·6	298·7	314·7	332·2	350·9
283·6	284·0	284·7	285·6	287·0	288·4	290·2	292·0	294·1		296·3	298·5	300·9	303·2	305·6	308·0	310·3	312·7	315·0	317·4
160·6	173·0	185·4	197·8	210·5	223·1	235·6	248·4	260·8		273·5	286·0	298·9	311·3	323·9	336·5	348·9	1·3	13·5	25·2
266·3	266·8	267·4	267·9	268·9	269·7	270·7	271·9	273·0		274·1	275·3	276·5	277·7	278·8	279·8	281·0	281·8	282·7	283·5

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Śrav.	Dan.	Satab.	P. Bhad.	U. Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle.
Venus, A.D. 1765—A.D. 1999

Year	Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ..	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1903	Mars ...	158·0	155·6	154·6	155·1	156·2	158·7	161·9	165·8	170·1	175·0	180·3	185·7	191·6	197·9	204·0	210·5	217·3	224·2
	Merc. ...	0·9	19·2	35·6	48·7	54·7	51·1	44·6	47·1	58·2	73·6	91·2	109·8	128·0	145·2	160·6	170·9	173·2	166·7
	Jup. ...	318·5	320·5	322·5	324·4	325·9	327·3	328·4	329·2	329·6	329·8	329·6	329·0	328·2	327·1	325·8	324·5	323·0	321·7
	Ven. ...	31·8	44·0	55·7	67·4	79·1	90·5	101·3	112·1	122·3	132·1	141·3	149·3	155·5	158·7	159·4	155·6	149·0	144·3
	Sat. ...	283·8	284·1	284·5	284·8	284·7	284·4	284·2	283·6	283·0	282·4	281·6	280·8	280·1	279·4	278·8	278·1	277·9	277·8
	Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1904	Mars ...	11·7	19·6	26·3	33·6	40·7	47·8	54·8	61·5	68·4	75·1	81·7	88·5	94·9	101·5	107·8	114·1	120·5	126·7
	Merc. ...	13·5	27·4	34·8	33·2	25·9	26·4	36·1	51·3	68·9	87·6	105·9	124·0	140·0	152·0	156·6	152·2	145·7	147·9
	Jup. ...	346·4	348·8	351·1	353·4	355·5	357·7	359·7	1·4	2·9	4·2	5·2	6·0	6·2	6·3	5·9	5·3	4·3	3·0
	Ven. ..	337·0	349·3	1·4	13·8	26·0	38·3	50·0	62·8	70·0	87·4	99·5	111·8	125·0	136·2	148·7	160·8	173·3	185·7
	Sat. ...	294·6	295·2	295·9	296·4	296·3	296·5	296·5	296·0	295·5	295·0	294·2	293·4	292·6	291·9	291·3	290·6	290·2	289·8
1905	Mars ...	211·3	209·5	206·9	203·6	200·4	198·2	197·2	197·8	199·1	202·0	205·2	209·3	214·1	219·2	225·0	230·8	237·2	243·8
	Merc. ...	14·6	15·1	7·9	6·1	14·8	28·9	46·1	64·7	83·6	101·9	118·6	132·1	139·1	136·7	130·6	129·8	139·1	152·8
	Jup. ...	13·7	16·0	18·4	20·8	23·3	25·7	28·0	30·2	32·4	34·2	36·3	37·9	39·4	40·5	41·4	42·2	42·5	42·3
	Ven. ...	22·6	18·3	11·8	7·2	6·1	9·2	15·0	22·1	31·3	40·8	50·9	61·6	72·5	84·2	96·1	107·3	118·9	131·3
	Sat .	305·6	306·3	307·0	307·8	308·0	308·3	308·5	308·2	307·9	307·6	307·0	306·4	305·6	304·8	304·0	303·2	302·7	302·2
	Eng date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1906	Mars ...	26·6	33·5	40·4	47·5	54·2	61·0	67·8	74·5	81·0	87·7	94·4	100·7	107·2	113·7	120·0	126·5	132·7	139·9
	Merc. ...	350·5	346·9	353·3	6·3	23·3	41·8	60·8	79·5	96·9	111·8	120·9	120·4	113·2	111·0	119·0	132·1	148·6	165·9
	Jup. ...	41·6	43·8	45·9	48·2	50·5	52·9	55·2	57·5	59·9	62·2	64·5	66·5	68·5	70·2	71·9	73·6	75·0	76·0
	Ven. ...	14·4	26·7	39·0	51·3	63·4	75·4	87·4	99·2	111·0	122·8	134·5	146·2	157·7	168·6	179·6	190·2	200·3	209·5
	Sat ...	316·6	317·5	318·4	319·3	319·8	320·3	320·8	320·7	320·6	320·6	320·0	319·5	318·9	318·1	317·3	316·5	315·8	315·1
1907	Mars ..	252·2	256·3	260·2	263·3	265·5	266·8	267·1	266·0	264·4	261·5	258·9	257·3	256·9	257·9	260·1	263·2	267·4	272·1
	Merc ...	332·7	314·8	0·9	19·1	37·9	56·9	74·7	90·2	101·1	103·2	96·7	92·7	98·5	111·2	127·8	144·7	162·6	180·2
	Jup. ...	69·7	71·2	72·8	74·7	76·7	78·8	81·0	83·2	85·6	87·9	90·1	92·5	94·7	97·0	99·0	101·0	102·8	104·6
	Ven. ...	320·6	332·6	344·7	356·7	8·6	20·7	32·8	45·0	57·0	69·2	81·2	93·1	105·7	117·8	130·3	142·5	154·7	167·3
	Sat ...	327·7	328·8	329·9	330·9	331·6	332·2	332·9	333·1	333·3	333·5	333·1	332·8	332·4	331·7	331·9	330·2	329·4	328·6
	Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1908	Mars ...	41·1	47·7	54·3	60·9	67·6	74·1	80·6	87·1	93·5	99·9	106·3	112·7	119·2	125·6	131·9	138·3	144·7	151·0
	Merc. ...	338·5	356·2	14·9	34·0	52·2	68·5	80·5	85·1	79·8	74·1	78·5	90·1	105·7	123·2	141·8	159·3	175·8	189·6
	Jup. ..	99·5	100·1	101·0	102·0	103·4	104·9	106·8	108·8	110·7	112·8	115·0	117·2	119·4	121·6	123·8	126·1	128·2	130·3
	Ven. ...	45·0	55·6	64·9	74·0	81·3	87·7	89·4	89·8	85·1	78·7	73·7	72·7	75·8	81·6	89·1	97·9	107·7	118·2
	Sat. ...	338·9	340·1	341·3	342·5	343·4	344·2	345·2	345·7	346·2	346·6	346·4	346·3	346·2	345·6	345·0	344·4	343·6	342·8
1909	Mars ...	278·2	284·9	291·2	297·6	303·9	309·8	315·5	320·6	326·2	330·7	334·7	337·5	339·3	339·7	338·9	336·7	334·1	332·0
	Merc. ...	352·2	11·2	29·4	46·4	59·8	65·8	62·3	55·6	58·0	68·3	84·0	101·2	119·5	137·7	155·0	170·0	180·5	182·4
	Jup. ...	131·4	130·9	130·9	130·8	131·3	132·1	133·2	134·5	136·0	137·6	139·4	141·4	143·4	145·5	147·6	149·8	152·0	154·2
	Ven. ...	355·7	8·8	20·5	32·8	45·1	57·4	69·7	81·8	94·0	106·2	118·6	130·5	142·8	154·8	166·7	178·7	190·8	202·6
	Sat ...	350·6	351·9	353·2	354·4	355·5	356·6	357·6	358·3	359·0	359·7	359·8	0·0	0·1	359·7	359·3	358·8	358·0	357·2
	Eng. date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1910	Mars ...	56·0	62·0	68·4	74·4	80·5	87·0	93·3	99·4	105·7	112·0	118·4	124·6	130·9	137·3	143·6	149·9	156·4	163·0
	Merc ...	6·9	24·0	38·1	46·0	44·3	37·0	37·6	46·9	61·7	79·1	97·6	115·9	133·9	149·7	161·7	166·4	161·7	155·2
	Jup. ...	164·8	163·7	162·5	161·6	161·1	161·0	161·1	161·8	162·3	163·4	164·6	166·1	167·1	169·7	171·6	173·7	175·7	177·9
	Ven. ...	313·6	322·9	333·1	343·8	354·5	5·3	17·2	28·9	40·4	52·4	64·6	75·9	87·9	100·0	112·2	124·4	136·8	148·7
	Sat. ...	2·4	3·7	5·0	6·3	7·5	8·7	9·9	10·8	11·7	12·6	13·0	13·4	13·9	13·8	13·6	13·4	12·8	12·2
1911	Mars ...	298·5	300·0	313·4	326·0	328·2	335·3	342·7	349·6	356·5	3·2	9·5	15·9	21·5	27·2	32·2	36·4	40·2	43·1
	Merc. ...	16·5	26·0	26·1	19·2	17·0	25·1	39·5	56·6	75·0	93·7	111·9	128·5	142·2	148·9	147·0	139·4	135·8	147·9
	Jup. ...	198·8	197·6	197·0	194·9	193·8	192·8	191·9	191·4	191·4	191·4	191·7	192·6	193·5	194·9	196·3	198·0	199·7	201·7
	Ven. ..	32·4	44·4	56·3	67·8	79·5	90·9	101·6	112·3	122·6	132·1	140·9	148·5	154·3	157·2	156·6	151·8	145·7	140·8
	Sat. ..	14·4	14·9	17·0	18·4	18·8	21·0	22·3	23·4	24·5	25·6	26·2	27·0	27·6	27·8	27·9	28·0	27·6	27·2
	Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1912	Mars ..	71·2	76·9	82·5	88·3	94·1	100·0	106·0	112·0	118·2	124·2	130·4	136·8	143·0	149·4	155·7	162·2	168·8	175·3
	Merc ...	8·0	1·7	357·5	4·0	16·9	33·8	52·1	71·1	89·9	107·1	121·6	130·9	130·7	123·7	121·3	128·0	141·8	158·0
	Jup ...	232·4	231·0	230·6	229·9	228·6	227·3	225·9	224·8	223·7	222·9	222·2	222·0	222·0	222·4	223·3	224·4	225·4	226·8
	Ven. ..	337·5	349·8	2·1	14·8	26·5	37·8	51·1	63·3	75·5	87·9	100·0	112·3	125·3	136·9	149·2	161·3	173·8	186·2
	Sat. ...	26·8	28·1	29·4	30·6	32·0	33·4	34·8	36·0	37·2	38·5	39·4	40·2	41·1	41·5	41·9	42·4	42·2	42·1
1913	Mars ...	317·0	324·6	332·5	339·8	347·7	355·1	2·7	9·9	17·2	24·3	31·3	38·3	46·6	51·0	57·1	63·1	68·7	73·8
	Merc. ...	339·0	348·2	355·8	11·4	29·4	48·4	67·4	86·0	100·6	111·3	113·8	107·2	103·4	108·8	120·9	137·2	154·8	172·3
	Jup. ...	264·0	264·6	264·8	264·7	264·4	263·6	262·6	261·4	260·1	258·8	257·5	256·3	255·5	254·7	254·4	254·4	254·6	255·3
	Ven. ..	19·5	14·2	8·3	4·2	4·1	8·1	14·3	22·1	31·0	41·0	51·4	61·9	73·0	84·3	96·0	107·8	119·7	131·6
	Sat. ...	39·4	40·7	42·0	43·3	44·6	45·9	47·3	48·6	49·9	51·2	52·3	53·4	54·4	55·1	55·8	56·5	56·6	56·6
	Eng. date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1914	Mars .	88·6	93·1	97·9	103·2	108·5	113·8	119·5	125·2	131·2	137·2	143·2	149·2	155·6	162·1	168·5	175·1	181·6	188·3
	Merc. ...	338·5	348·8	6·4	25·3	44·3	62·7	78·7	91·1	95·7	90·7	84·9	89·0	100·3	115·8	133·0	151·0	168·8	185·1
	Jup. ...	293·8	295·4	296·7	297·7	298·9	299·0	299·2	298·6	298·1	297·2	296·2	295·0	293·6	292·4	291·2	290·1	289·2	288·7
	Ven. ...	15·1	27·3	39·8	51·9	64·0	76·0	87·9	99·8	111·4	123·4	135·0	146·6	157·9	169·2	180·0	190·4	200·1	209·4
	Sat ...	52·3	53·5	54·7	55·8	57·1	58·4	59·8	61·1	62·5	63·9	65·1	66·3	67·5	68·4	69·3	70·2	70·6	71·5

Mesh.	Vrsh.	Mith.	Kat.	Sim.	Kan	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·6	120·0

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 8	Mr 18	Mr 28	Ap 7
231·2	238·2	245·5	252·9	260·3	267·9	275·6	283·1	290·9	**1904**	298·7	306·6	314·3	321·1	329·8	337·5	345·3	352·8	0·8	7·8
161·8	166·7	178·4	193·9	210·7	228·1	245·0	260·4	272·4		277·8	274·1	267·1	268·6	278·5	293·4	310·7	328·7	347·2	4·8
320·7	319·8	319·3	319·0	319·8	319·7	320·6	321·8	323·2		324·8	326·6	328·6	330·7	332·9	335·3	337·6	340·0	342·5	344·9
142·9	144·2	150·6	158·1	167·1	176·8	187·1	198·0	209·4		220·9	233·0	245·0	257·1	269·2	281·5	293·6	306·0	318·2	330·7
277·5	277·9	278·2	278·6	279·4	280·2	281·0	282·1	283·2		284·2	285·4	286·6	287·8	289·0	290·3	291·8	292·8	293·2	294·2
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 8	Mr 18	Mr 28	Ap 7
132·9	138·9	144·9	150·9	156·6	162·4	168·0	173·5	179·0	**1905**	184·3	189·3	194·0	198·4	202·4	205·8	208·6	210·8	212·0	212·8
158·8	173·4	190·2	207·4	224·8	240·7	253·8	261·1	259·7		252·2	250·9	258·6	272·6	289·1	307·0	325·2	343·0	358·9	11·4
1·8	0·4	359·1	357·7	356·7	356·1	355·6	355·6	355·9		356·5	357·5	358·7	0·2	2·0	3·9	5·9	8·0	10·4	12·7
198·0	210·4	222·6	234·9	247·2	259·4	271·6	283·8	295·9		307·6	319·0	330·2	341·0	351·4	0·7	9·6	16·7	21·5	23·1
289·2	289·4	289·5	289·5	290·2	290·9	291·5	292·5	293·5		294·5	295·7	296·9	298·0	299·2	300·4	301·7	302·8	303·9	305·0
250·5	257·5	264·6	271·8	279·4	286·4	294·0	301·5	309·1	**1906**	316·6	324·0	331·7	339·0	346·5	354·0	1·1	8·6	15·7	22·8
169·2	185·5	204·3	220·8	234·8	244·3	245·2	238·1	234·2		240·0	252·3	267·9	285·4	303·3	321·2	337·3	350·6	357·0	354·8
41·9	41·1	40·1	38·9	37·5	35·9	34·9	33·5	32·9		32·1	31·8	31·9	32·2	33·0	34·0	35·2	36·7	38·4	40·3
143·3	155·1	167·3	179·7	192·0	204·5	217·5	230·6	242·1		254·8	267·5	280·0	292·8	305·2	317·8	330·3	342·9	355·4	7·6
301·7	301·6	301·4	301·2	301·7	302·1	302·6	303·5	304·4		305·2	306·3	307·4	308·6	309·9	311·2	312·4	313·7	314·9	316·0
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
145·2	151·5	157·7	163·8	170·8	176·1	182·2	188·3	194·3	**1907**	200·5	206·2	212·1	217·9	223·7	229·3	234·8	240·0	245·0	249·9
183·9	200·5	215·6	226·7	230·2	224·6	218·6	221·0	232·5		247·3	264·6	282·1	299·7	316·2	330·1	338·5	337·6	330·1	329·2
76·7	77·0	77·1	76·8	76·2	75·3	74·2	72·7	71·5		70·4	69·1	68·1	67·2	66·8	66·8	66·9	67·3	68·1	68·9
213·0	224·8	229·3	230·8	228·3	222·7	217·3	215·1	217·1		221·8	229·2	237·9	247·4	257·7	268·6	279·7	291·0	302·7	314·4
314·3	314·1	313·9	313·4	313·6	313·8	314·1	314·9	315·6		316·3	317·4	318·5	319·5	320·7	321·9	323·2	324·5	325·8	327·1
																Mr 8	Mr 18	Mr 28	Ap 7
277·3	283·1	289·1	295·6	302·1	308·8	315·4	322·0	329·1	**1908**	335·9	342·9	347·9	356·8	3·7	10·6	17·2	24·1	30·8	37·6
195·8	208·5	214·5	211·6	204·2	204·3	213·1	227·2	243·5		261·0	278·8	295·4	309·7	319·6	320·8	314·1	310·5	316·8	330·1
106·1	107·6	108·6	109·3	109·8	109·9	109·5	109·1	108·4		107·4	106·3	105·1	103·6	102·5	101·4	100·4	99·8	99·5	99·6
179·8	192·3	204·7	217·3	229·8	242·6	255·1	267·4	280·0		292·4	305·0	317·1	329·4	341·6	353·6	5·2	16·9	23·4	39·3
327·8	327·3	326·8	326·1	326·3	326·2	326·2	326·7	327·2		327·9	328·9	329·9	330·8	332·1	333·2	334·4	335·7	337·0	338·3
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 8	Mr 18	Mr 28	Ap 7
157·4	163·8	170·1	176·6	183·0	189·5	195·8	202·8	208·9	**1909**	215·3	221·9	228·4	235·0	241·6	248·2	255·0	261·5	268·1	274·8
198·0	197·4	189·9	187·4	194·7	207·3	223·2	240·5	258·0		274·8	289·8	300·6	304·1	298·0	292·8	297·3	308·6	321·9	342·4
132·3	134·0	135·7	137·3	138·7	139·6	140·6	141·1	141·2		141·1	140·7	139·9	138·7	137·6	136·4	135·1	133·8	132·7	131·8
129·0	140·3	151·9	163·6	175·3	187·6	199·9	212·2	224·4		236·8	249·5	261·8	274·5	286·8	299·5	311·9	324·3	336·9	349·1
341·9	341·2	340·5	339·8	339·5	339·2	339·1	339·4	339·7		340·0	340·8	341·7	342·5	343·6	344·7	345·9	347·2	348·5	349·8
330·3	330·3	332·2	333·3	336·3	340·0	344·2	348·9	353·9	**1910**	359·1	4·7	10·4	16·1	22·1	28·0	34·6	40·1	46·3	52·5
175·9	171·2	176·2	187·7	202·9	219·9	237·2	254·4	269·8		282·1	287·3	283·3	276·7	278·3	288·1	303·0	320·4	338·7	357·2
156·4	158·6	160·6	162·6	164·5	166·1	167·6	168·9	169·9		170·9	171·4	171·5	171·4	170·9	170·2	169·1	168·0	166·7	165·5
214·5	226·4	237·6	249·1	260·0	270·7	280·4	289·8	297·7		304·0	307·2	307·2	303·3	297·0	292·4	291·8	294·8	300·7	308·2
356·5	355·7	354·8	354·0	353·6	353·1	352·7	352·7	352·8		352·9	353·5	354·1	354·8	355·8	356·8	357·9	359·1	0·3	1·6
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
169·4	176·0	182·6	189·3	195·9	202·6	209·2	216·1	223·0	**1911**	229·9	237·0	243·9	251·1	258·2	265·5	272·7	280·0	287·3	294·6
157·6	168·1	182·8	199·4	216·8	234·0	250·0	262·9	270·7		268·8	261·3	260·2	268·3	282·0	298·8	316·8	335·1	353·0	8·9
180·1	182·3	184·4	186·6	188·8	190·9	192·8	194·6	196·3		197·9	199·4	200·3	201·2	201·6	201·7	201·6	201·3	200·5	199·5
161·2	173·7	186·2	199·2	211·2	223·9	236·3	249·2	261·7		274·3	286·8	299·5	312·0	324·6	337·1	349·4	1·9	14·1	25·9
11·5	10·7	9·9	9·0	8·3	7·6	6·9	6·8	6·6		6·3	6·7	7·1	7·5	8·4	9·3	10·1	11·3	12·5	13·7
																Mr 8	Mr 18	Mr 28	Ap 7
44·8	45·2	44·6	43·0	40·0	37·0	34·5	32·8	32·3	**1912**	32·9	34·7	37·1	40·4	44·1	48·4	53·0	57·9	63·1	68·4
162·5	178·7	196·3	213·4	229·9	244·1	255·4	254·2	247·2		243·5	248·9	261·6	277·5	295·2	313·3	331·2	347·6	0·9	8·2
203·8	205·8	207·9	210·2	212·4	214·6	216·8	219·0	221·1		223·2	225·0	226·7	228·3	229·8	230·9	231·8	232·4	232·7	232·7
140·5	143·0	150·0	157·7	166·8	176·8	187·1	198·2	209·7		221·8	233·7	245·4	257·6	269·7	282·1	294·1	306·4	318·8	331·3
26·7	25·9	27·7	24·4	23·6	22·8	21·9	21·4	20·9		20·5	20·6	20·7	20·8	21·5	22·2	22·9	24·0	25·1	26·1
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 8	Mr 18	Mr 28	Ap 7
181·9	188·6	195·3	202·3	209·1	216·1	223·1	230·2	237·4	**1913**	244·7	254·1	259·5	266·9	274·6	282·0	289·9	297·5	305·2	312·9
175·4	193·0	209·9	224·6	235·8	238·8	234·0	227·8	231·0		241·6	256·8	273·8	291·0	309·4	326·4	340·0	348·6	348·4	341·0
228·6	230·4	232·4	234·5	236·7	238·9	241·1	243·3	245·7		247·9	250·1	258·8	254·3	256·3	258·2	259·9	261·5	262·8	263·6
198·5	210·8	223·8	235·4	247·7	260·1	272·1	284·2	296·1		307·9	320·1	330·5	341·2	351·3	0·9	9·4	15·6	18·8	21·3
41·9	41·3	40·6	39·9	39·0	38·2	37·3	36·7	36·1		35·3	35·1	34·9	34·8	35·2	35·6	35·9	36·9	37·8	38·8
78·5	82·9	86·6	89·8	91·8	92·9	92·9	91·3	88·7	**1914**	85·4	81·1	78·4	76·0	75·1	75·5	77·3	79·6	82·8	86·8
189·7	205·2	218·1	225·0	220·1	211·6	213·5	222·5	236·6		252·9	270·5	288·3	305·1	319·9	329·7	331·1	324·1	320·7	327·8
256·2	257·6	259·2	260·8	262·5	264·5	266·6	268·9	271·0		273·3	275·6	278·0	280·3	282·7	284·9	287·1	289·2	291·2	293·2
143·6	155·8	168·2	180·7	193·0	205·3	217·9	230·3	242·6		255·3	268·2	280·7	293·5	306·0	319·0	331·0	343·7	356·5	8·6
56·7	56·9	55·9	55·4	54·6	53·8	52·9	52·2	51·4		50·6	50·2	49·8	49·3	49·4	49·6	49·7	50·4	51·1	51·8
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
195·2	202·1	209·1	215·9	222·9	230·0	237·3	244·7	252·1	**1915**	260·0	267·6	275·2	282·9	290·7	298·8	306·2	314·2	322·2	329·9
198·8	207·0	206·4	198·9	196·6	203·8	216·6	232·5	249·7		267·2	284·2	299·2	310·5	313·9	308·1	302·6	307·3	318·8	334·7
288·5	288·8	289·3	290·1	291·3	292·6	294·2	295·9	298·2		300·3	302·4	304·8	307·1	309·4	311·8	314·3	316·7	319·1	321·4
217·4	224·1	227·8	229·0	224·6	218·5	213·6	212·6	215·4		221·1	228·5	237·4	247·4	257·9	268·8	279·9	291·4	303·1	315·0
71·4	71·2	71·0	70·9	70·2	69·5	68·9	68·0	67·1		66·3	65·6	64·9	64·2	64·0	63·9	63·8	64·2	64·6	65·1

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Śrav.	Dan.	Satab.	P. Bhad.	U. Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle. Venus, A.D. 1765—A.D. 1999;

Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
Eng. date .	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1915 Mars .	334·0	341·9	349·6	357·8	4·8	12·4	19·7	27·1	34·4	41·4	48·4	54·9	61·8	68·5	74·7	81·0	87·0	92·8
Merc. ...	344·2	2·5	21·5	40·0	56·9	70·2	76·7	73·7	66·8	68·4	78·8	94·1	111·4	129·6	147·6	164·7	179·4	189·6
Jup. ...	322·2	324·4	326·4	328·4	330·0	331·6	332·8	333·7	334·4	334·8	334·9	334·4	333·7	332·7	331·5	330·2	328·8	327·4
Ven. ...	321·3	333·1	345·2	357·4	9·1	21·4	33·5	45·5	57·6	69·7	81·9	94·0	106·3	118·6	131·0	143·2	155·6	168·0
Sat. ...	65·5	66·5	67·5	68·5	69·8	71·1	72·3	73·7	75·0	76·3	77·6	78·9	80·2	81·3	82·4	83·5	84·1	84·8
Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1916 Mars ...	110·8	113·3	116·6	120·7	124·9	129·7	134·5	140·5	145·5	151·0	156·9	162·8	169·3	175·5	182·1	188·6	195·1	202·0
Merc. ...	358·7	17·1	34·3	48·7	57·0	56·0	48·7	48·0	57·6	72·2	89·8	107·6	126·0	143·8	159·4	171·4	176·0	171·2
Jup. ...	349·9	352·3	354·7	357·1	359·3	1·4	3·5	5·3	7·0	8·0	9·6	10·5	11·1	11·3	11·1	10·6	10·0	8·9
Ven ...	45·2	55·6	65·1	73·8	80·6	86·0	87·6	86·7	82·9	75·3	70·7	70·9	74·5	80·8	88·9	97·8	107·9	118·4
Sat. ...	79·1	79·9	80·7	81·5	82·6	83·7	84·9	86·2	87·5	88·9	90·2	91·5	92·9	94·1	95·3	96·4	97·4	98·2
Eng. date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1917 Mars ...	350·4	358·1	5·4	13·1	20·5	28·1	35·0	42·3	49·8	56·6	63·2	69·8	76·6	83·0	89·6	95·8	101·9	108·1
Merc. ..	12·0	27·3	37·3	37·4	30·2	28·1	36·2	50·0	67·0	85·1	103·8	122·0	138·5	152·1	158·2	156·8	149·1	149·8
Jup. ...	17·7	20·1	22·5	24·9	27·3	29·7	32·0	34·4	36·5	38·6	40·5	42·2	43·8	45·0	46·1	46·8	47·2	47·3
Ven. ...	356·5	8·8	21·2	33·5	45·9	58·1	70·2	82·5	94·4	106·9	119·1	131·2	143·3	155·3	167·3	179·2	191·4	203·0
Sat. ...	92·7	93·2	93·7	94·3	95·4	96·4	97·3	97·7	99·7	101·0	102·4	103·8	105·1	106·3	107·5	108·8	109·8	110·9
1918 Mars ...	141·8	141·1	141·4	143·2	145·8	149·0	152·8	157·2	162·1	167·4	73·0	178·7	184·7	191·0	197·4	203·9	210·6	217·9
Merc. ...	16·0	19·0	12·5	8·3	14·6	27·6	45·1	62·6	81·6	101·0	117·3	131·6	140·8	141·0	133·7	131·1	138·6	151·6
Jup ...	45·3	47·5	49·6	51·8	53·7	56·4	58·7	61·0	63·4	65·7	68·0	70·2	72·2	73·9	75·8	77·5	78·9	80·0
Ven. ...	318·4	328·1	333·2	344·0	354·9	6·3	17·6	29·3	41·1	53·0	65·0	76·5	88·7	100·7	112·9	125·1	137·3	149·6
Sat. ...	106·5	106·7	106·9	107·3	108·1	108·9	109·6	110·7	111·8	113·7	114·3	115·6	116·8	118·1	119·4	120·8	121·9	123·0
1919 Mars ...	6·0	13·3	20·5	27·9	35·0	42·2	49·4	56·4	63·3	69·8	76·8	83·6	89·7	96·3	103·1	109·4	115·6	121·4
Merc. .	355·5	349·5	353·3	5·6	21·4	39·6	58·7	77·4	95·2	110·7	121·7	124·2	118·0	113·5	113·5	130·9	146·5	163·7
Jup. ...	73·9	75·2	76·9	78·6	80·5	82·5	84·6	86·8	89·1	91·4	93·6	95·9	98·3	100·5	102·6	104·7	106·7	108·4
Ven. ..	32·9	44·8	56·6	68·8	79·8	91·0	102·2	112·6	122·5	131·9	140·4	147·6	152·7	154·9	153·3	147·8	140·2	138·2
Sat. ...	120·4	120·3	120·2	120·3	120·9	121·5	122·0	122·9	123·9	124·9	126·1	127·3	128·6	129·9	131·2	132·4	133·6	134·8
Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1920 Mars ...	189·6	186·4	182·7	180·5	179·0	179·0	180·1	182·3	185·6	189·5	194·0	198·7	204·5	210·3	215·9	222·3	228·8	235·3
Merc. ...	332·7	343·5	359·0	16·8	35·7	54·6	73·2	89·5	101·8	106·4	101·3	95·7	99·4	110·3	125·4	142·8	160·4	178·1
Jup. ...	103·8	104·2	104·9	105·9	107·1	108·5	110·3	112·1	114·0	116·2	118·3	120·4	122·6	124·9	127·0	129·2	131·5	133·5
Ven. ...	338·2	350·5	2·9	15·1	27·4	39·6	52·0	64·2	76·4	88·9	101·0	113·2	125·4	137·8	150·0	162·4	174·7	187·1
Sat. ...	134·2	133·9	133·6	133·4	133·8	134·1	134·4	135·2	136·0	136·7	137·9	139·0	140·2	141·4	142·6	143·9	145·2	146·5
Eng. date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1921 Mars ...	20·8	28·0	35·1	42·2	49·1	56·0	62·8	69·5	76·4	82·9	89·5	96·0	102·5	109·0	115·4	121·7	128·0	134·1
Merc. ..	337·2	354·4	12·9	31·7	50·3	67·1	80·6	87·6	84·5	77·6	79·1	89·3	103·3	121·2	139·3	157·2	173·5	189·0
Jup. ...	135·8	135·2	134·9	135·0	135·2	136·0	136·9	138·0	139·4	141·1	142·8	144·7	146·8	148·9	151·0	153·2	155·4	157·5
Ven. ...	16·2	10·8	4·9	1·7	3·2	7·1	13·7	21·9	31·1	41·0	51·4	62·2	73·4	84·7	96·4	107·6	120·1	131·9
Sat. ...	147·9	147·4	146·9	146·5	146·5	146·6	146·6	147·2	147·8	148·4	149·4	150·3	151·3	152·5	153·7	154·9	156·2	157·5
1922 Mars ...	239·0	241·3	242·4	242·7	242·1	240·4	236·8	234·7	232·5	231·4	231·3	232·7	235·3	238·7	243·1	248·0	253·5	259·1
Merc. ...	350·2	9·0	27·4	44·8	59·2	67·8	67·1	59·7	59·1	69·6	82·3	99·3	117·4	135·8	153·0	168·8	180·7	185·2
Jup. .	169·4	168·1	167·0	166·2	165·4	165·1	165·1	165·3	166·1	166·9	168·0	169·4	171·1	172·8	174·7	176·7	178·8	180·9
Ven. ...	15·7	27·9	40·2	52·2	64·4	76·3	88·4	100·3	112·1	123·8	135·3	146·8	158·0	169·2	179·9	190·2	200·0	209·1
Sat. ..	161·3	160·6	160·0	159·4	159·2	159·0	158·9	159·1	159·5	159·9	160·7	161·5	162·3	163·4	164·5	165·6	166·8	168·0
1923 Mars ...	35·5	42·2	49·0	55·7	62·4	69·1	75·7	82·2	88·6	95·3	101·8	108·0	114·6	120·9	127·2	133·6	140·0	146·4
Merc. ...	5·1	22·4	37·6	47·5	48·8	41·8	39·1	46·2	60·4	77·1	95·3	113·9	131·9	148·2	161·8	168·4	166·4	158·9
Jup ...	203·5	202·3	201·1	199·7	198·5	197·3	196·3	195·7	195·8	195·3	195·5	196·2	197·0	198·1	199·6	201·2	202·9	204·9
Ven. ...	321·7	333·6	345·6	357·6	9·7	21·8	33·9	46·1	58·2	70·4	82·4	94·8	107·0	119·3	131·6	143·8	156·3	168·8
Sat. ...	174·4	173·7	173·0	172·2	171·8	171·4	171·0	171·1	171·3	171·3	171·9	172·5	173·2	174·2	175·2	176·2	177·4	178·6
Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1924 Mars ...	269·1	275·0	280·7	286·2	291·4	296·5	300·8	304·7	307·7	309·9	310·9	309·0	308·4	305·9	303·4	301·5	301·2	301·7
Merc. . .	15·5	27·0	30·0	23·1	19·5	25·3	38·1	54·5	72·7	91·5	109·9	127·1	141·7	150·3	150·6	143·0	140·9	148·1
Jup. .	236·9	236·5	235·7	234·8	233·6	232·3	231·0	229·8	228·5	227·5	226·8	226·4	226·3	226·5	227·1	228·0	229·2	230·5
Ven. ...	45·1	55·5	61·9	73·1	80·1	84·4	85·7	83·6	77·6	71·3	68·3	68·9	73·4	80·4	88·6	97·9	108·2	118·9
Sat. ...	187·1	186·3	185·5	184·7	184·2	183·7	183·1	183·0	183·0	182·8	183·2	183·6	184·1	184·9	185·8	186·7	187·8	188·9
Eng. date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1925 Mars ...	50·1	56·5	62·9	69·3	75·6	81·9	88·3	94·5	101·0	107·4	113·7	120·1	126·3	132·7	139·2	145·4	151·9	158·2
Merc. ...	11·2	6·4	0·6	4·4	16·2	31·9	50·1	68·8	88·0	104·7	121·0	132·2	134·3	127·9	123·5	128·7	140·7	156·1
Jup. ...	268·4	269·1	269·6	269·5	269·2	268·6	267·8	266·6	265·3	263·9	262·5	261·3	260·2	259·5	259·0	258·8	259·0	259·6
Ven. ...	357·2	9·6	21·9	34·2	46·6	58·7	70·9	83·2	95·3	107·5	119·5	131·8	143·7	155·9	167·7	179·8	191·8	203·5
Sat. ...	199·5	198·7	197·9	197·2	196·5	195·8	195·2	194·9	194·7	194·3	194·5	194·7	195·0	195·7	196·4	197·1	198·2	199·2
1926 Mars ...	291·0	298·1	305·2	312·4	319·5	326·4	333·3	339·9	346·4	352·7	358·4	4·0	9·2	13·7	17·5	20·4	21·6	21·9
Merc. ...	342·4	343·6	354·4	9·5	27·2	46·1	65·1	83·4	99·6	112·0	117·0	112·1	105·9	108·8	120·2	135·3	152·3	170·0
Jup. ...	297·9	299·6	301·1	302·2	303·1	303·7	303·9	303·8	303·3	302·6	301·5	300·3	299·0	297·5	296·2	295·1	294·2	293·5
Ven. ...	313·4	323·1	333·4	344·4	355·3	6·8	18·0	29·7	41·7	53·2	65·2	77·0	89·2	101·3	113·5	125·5	137·9	150·3
Sat. ...	211·6	*210·9	210·2	209·4	208·6	207·8	207·1	206·7	206·3	205·9	205·9	205·8	205·8	206·3	206·9	207·4	208·3	209·2

Mesh.	Vrsh.	Mith.	Kat.	Sim.	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999, Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 8	Mr 18	Mr 28	Ap 7
98·4	104·1	108·9	113·5	117·8	121·7	125·0	127·0	127·9	**1916**	128·3	127·2	124·4	121·3	118·2	113·8	110·8	109·1	108·8	109·9
191·8	185·2	180·5	185·3	197·0	212·1	228·7	246·4	263·7		279·1	291·5	296·9	293·2	286·3	287·7	298·2	[illegible]	330·4	348·8
326·3	325·6	324·9	324·4	324·3	324·7	325·3	326·3	327·6		329·2	329·8	332·7	334·8	337·0	339·2	341·6	344·0	346·4	348·8
180·5	193·0	205·6	218·1	231·1	243·7	256·2	268·7	281·0		293·7	306·0	318·2	330·2	342·5	354·5	6·1	17·8	28·8	39·8
86·5	85·6	85·6	85·6	85·2	84·8	84·3	83·5	82·7		81·9	81·1	80·3	79·5	79·1	78·7	78·2	78·4	78·5	78·6
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 8	Mr 18	Mr 28	Ap 7
209·2	215·9	223·3	230·4	237·5	245·3	252·7	260·3	267·9	**1917**	275·7	283·6	291·2	299·1	306·9	314·8	322·6	330·7	338·5	346·3
164·7	167·2	177·2	191·9	208·6	225·9	243·1	259·1	272·3		279·8	278·4	271·1	269·5	278·1	291·7	308·5	326·8	344·3	3·3
7·8	6·4	5·0	3·8	2·6	1·7	1·0	0·9	0·9		1·4	2·1	3·2	4·4	6·1	7·9	9·7	11·9	14·1	16·4
129·5	140·8	152·5	164·2	176·3	188·3	200·5	212·7	225·0		237·5	250·2	262·5	275·2	288·0	300·0	312·6	325·1	337·6	350·0
99·1	99·4	99·7	100·1	99·9	99·6	99·5	98·8	98·1		97·4	96·5	95·6	94·8	94·2	93·6	92·9	92·8	92·7	92·6
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
118·9	120·1	125·2	130·9	136·1	140·9	145·8	149·9	153·7	**1918**	156·5	158·8	159·9	160·1	159·0	156·1	152·5	148·6	145·2	142·9
157·8	171·8	188·0	205·5	222·8	239·2	253·2	262·8	263·2		256·0	252·5	258·8	271·1	286·9	304·7	323·0	340·9	357·8	11·6
47·0	46·4	45·5	41·3	43·1	40·8	40·3	[illegible]	38·1		37·3	36·9	36·7	37·0	37·6	38·5	39·6	40·9	42·5	44·3
215·0	226·7	237·8	249·2	260·1	270·5	280·2	289·2	296·8		302·2	304·8	303·7	298·4	292·1	289·1	290·8	294·1	300·8	308·7
111·9	112·5	113·1	113·7	113·8	113·9	113·9	113·4	112·8		112·3	111·5	110·7	110·0	109·2	108·4	107·6	107·2	106·9	106·5
224·5	231·5	238·8	246·0	253·6	261·1	268·7	276·4	284·3	**1919**	292·0	299·8	307·7	315·5	323·2	331·1	338·9	346·6	354·2	1·7
167·7	184·6	202·3	219·0	234·1	244·0	248·2	242·5	236·6		240·2	251·2	267·2	283·3	301·4	319·4	336·1	350·3	359·3	359·0
80·9	81·1	81·8	81·6	81·2	80·3	79·0	78·1	76·8		75·6	74·3	73·2	72·2	71·6	71·3	71·3	71·5	72·3	73·3
161·9	174·4	186·8	199·7	211·9	224·6	237·0	249·8	262·4		275·1	287·6	300·0	312·7	325·3	337·8	350·1	2·4	14·7	26·6
124·2	125·0	125·8	126·7	127·0	127·2	127·6	127·4	127·2		126·9	126·2	125·5	124·7	124·0	123·8	122·5	121·9	121·3	120·7
																Mr 8	Mr 18	Mr 28	Ap 7
127·9	133·9	139·6	145·4	151·1	156·8	162·1	167·4	172·7	**1920**	177·3	181·8	186·0	189·4	192·6	194·6	195·5	195·6	194·1	191·6
181·5	198·7	214·3	226·7	232·5	229·4	221·9	222·3	231·8		245·9	262·4	280·2	297·7	314·8	329·4	339·6	341·4	334·8	331·1
110·0	111·3	112·5	113·4	114·1	114·4	114·4	114·1	113·3		112·4	111·3	109·9	108·6	107·4	106·2	105·2	104·4	104·0	108·9
138·9	142·5	149·1	157·4	166·4	176·7	187·5	198·6	209·9		221·6	234·3	245·9	258·1	270·2	282·6	294·7	307·2	319·4	331·8
136·1	137·1	138·0	139·1	139·6	140·2	140·7	140·7	140·7		140·6	140·1	139·6	139·1	138·3	137·5	136·7	136·0	135·3	134·5
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 8	Mr 18	Mr 28	Ap 7
242·3	249·4	255·5	263·8	271·2	279·0	286·4	294·1	301·9	**1921**	309·5	317·3	325·0	332·3	340·1	347·6	355·0	2·5	9·4	16·8
194·5	203·1	216·3	215·2	207·9	204·9	212·9	225·8	241·7		258·9	276·5	293·6	301·1	320·4	324·1	318·5	313·1	316·7	328·7
135·5	137·6	139·4	140·9	142·3	143·6	144·5	145·1	145·5		145·5	145·1	144·5	143·6	142·5	141·2	140·0	138·6	137·3	135·8
199·4	211·7	224·3	236·2	248·4	260·5	272·8	284·7	296·6		308·2	319·7	330·8	341·2	351·4	0·5	8·4	14·7	18·0	18·0
147·7	148·8	149·9	150·9	151·7	152·3	153·1	153·3	153·5		153·8	153·4	153·1	152·8	152·1	151·4	150·6	149·9	149·1	148·3
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
140·4	146·7	152·8	158·8	164·9	171·0	176·9	182·6	188·7	**1922**	194·3	200·1	205·4	210·7	216·0	220·9	225·8	230·1	233·9	237·5
199·0	200·8	194·1	189·6	194·5	206·1	221·0	238·2	255·6		272·9	288·6	301·1	306·7	302·7	295·8	297·8	308·0	323·0	340·4
159·7	161·9	164·0	165·9	167·9	169·7	171·2	172·7	173·8		174·7	175·4	175·7	175·7	175·3	174·7	173·8	172·6	171·5	170·1
143·6	156·4	168·6	181·0	193·3	204·7	218·3	230·9	242·4		256·1	268·7	281·5	294·1	306·6	318·1	331·6	344·2	356·6	9·2
158·7	159·8	161·1	162·1	163·0	163·9	164·8	165·2	165·6		166·0	165·9	165·9	165·8	165·2	164·6	164·0	163·2	162·4	161·6
265·2	271·7	278·3	285·2	292·2	299·2	306·5	313·6	320·8	**1923**	328·1	335·2	342·6	349·7	356·9	3·8	10·9	18·0	24·8	31·7
180·5	174·0	176·3	186·6	201·1	217·8	235·0	252·2	268·4		281·6	289·3	287·8	280·3	279·2	287·4	301·4	318·4	336·6	355·4
183·1	185·3	187·5	189·6	191·8	193·9	195·9	197·9	199·6		201·2	202·7	203·9	204·8	205·4	205·9	205·9	205·5	205·0	204·0
216·5	222·5	225·8	225·2	221·2	215·1	210·8	210·3	214·0		220·2	228·2	237·5	247·4	258·1	268·9	280·3	291·7	303·6	315·3
169·3	170·5	171·7	172·9	173·9	174·9	175·9	176·5	177·1		177·8	177·9	178·1	178·2	177·8	177·4	177·1	176·3	175·5	174·8
																Mr 8	Mr 18	Mr 28	Ap 7
152·7	159·0	165·3	171·5	177·9	184·2	190·5	196·9	203·3	**1924**	209·5	215·9	222·2	228·5	234·9	241·2	247·4	253·7	259·8	266·0
158·4	166·8	181·3	197·4	214·6	231·9	248·3	262·5	271·8		272·6	265·6	262·0	267·6	280·8	296·7	314·8	333·1	351·2	7·9
206·9	208·9	211·1	213·3	215·5	217·7	220·0	222·2	224·3		226·4	228·4	230·2	231·9	233·4	234·7	235·6	236·5	236·9	236·9
181·2	193·5	206·2	218·6	231·1	243·7	256·2	268·7	281·0		293·7	306·0	318·2	330·2	342·5	354·5	6·1	17·8	28·8	39·8
179·7	180·9	182·1	183·4	184·5	185·6	186·7	187·4	188·2		189·0	189·1	189·6	190·0	189·8	189·5	189·4	188·8	188·2	187·6
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 8	Mr 18	Mr 28	Ap 7
303·9	306·9	311·0	315·3	320·4	325·8	331·2	337·1	343·2	**1925**	349·3	355·6	1·9	8·2	14·7	20·9	27·4	33·8	40·3	46·6
160·9	176·9	194·0	211·5	228·0	242·9	254·1	257·2	251·3		245·9	249·7	260·5	275·6	292·8	310·9	329·0	345·9	0·5	9·8
232·1	233·8	235·8	237·9	239·9	242·2	244·4	246·7	249·0		251·3	253·6	255·7	257·9	259·9	261·8	263·7	265·3	266·6	267·9
129·8	141·2	152·8	164·7	176·4	188·6	200·7	213·0	225·4		237·8	250·5	263·0	275·4	287·9	300·5	313·1	325·5	338·1	350·5
190·0	191·2	192·4	193·6	194·7	195·8	197·0	197·9	198·8		199·7	200·2	200·7	201·3	201·3	201·4	201·4	200·8	200·3	199·8
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
164·8	171·2	177·6	184·3	190·8	197·5	204·0	210·6	217·5	**1926**	224·3	231·2	238·1	244·9	252·0	258·9	266·0	273·1	280·2	287·2
173·3	189·9	208·2	223·6	236·0	241·3	238·5	231·0	231·2		241·0	255·1	271·6	289·3	307·3	324·5	339·5	350·1	352·1	345·5
260·4	261·6	262·9	264·5	266·2	268·2	270·3	272·4	274·4		277·0	279·3	281·8	284·0	286·4	288·6	290·9	293·1	295·1	297·1
215·3	226·8	238·3	249·4	260·2	270·5	280·1	288·8	296·0		300·9	302·3	300·3	295·0	289·4	286·8	288·5	293·0	299·8	308·4
200·2	201·4	202·6	203·7	204·9	206·1	207·2	208·2	209·2		210·2	210·9	211·5	212·3	212·5	212·7	212·9	212·6	[illegible]	211·9
20·7	18·3	15·7	12·6	11·5	10·7	10·8	12·3	14·7	**1927**	17·8	21·1	25·5	29·9	34·7	40·0	45·0	50·7	56·4	61·9
187·6	203·9	217·3	226·1	224·5	216·8	214·6	221·6	235·0		251·1	268·3	286·1	303·4	318·7	330·3	334·2	328·9	323·2	327·2
293·1	293·2	293·6	294·3	295·4	296·6	298·1	300·0	301·8		303·8	306·0	308·3	310·6	313·0	315·5	317·9	320·2	322·6	325·0
164·7	175·0	187·4	200·1	212·5	225·3	237·8	250·4	263·1		275·6	288·4	300·7	313·5	326·0	338·4	350·7	2·9	15·2	27·2
210·1	211·2	212·3	213·5	214·7	215·9	217·0	218·1	219·2		220·3	221·2	222·0	222·8	223·2	223·6	223·9	224·1	224·2	223·6
Mag.	**P. Phal.**	**U. Phal.**	**Hasta.**	**Chit.**	**Svati.**	**Visa.**	**Anur.**	**Jyesh.**		**Mula.**	**P. Ash.**	**U. Ash.**	**Śrav.**	**Dan**	**Satab**	**P. Bhad.**	**U. Bhad.**		**Revati.**
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0		253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7		360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle. Venus, A.D. 1765—A.D. 1999;

Year	Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1927	Mars. ..	65·0	70·9	76·8	82·7	88·8	94·9	100·9	107·1	113·2	119·4	125·8	131·9	138·3	144·6	151·0	157·5	163·8	170·5
	Merc. ...	332·9	347·1	4·6	23·2	42·2	60·8	77·7	91·8	98·2	95·6	88·6	89·3	99·5	114·1	131·1	148·8	166·5	183·5
	Jup.	326·1	328·4	330·5	332·4	334·3	335·9	337·2	338·3	339·2	339·6	339·8	339·6	339·0	338·1	337·1	335·8	334·4	332·9
	Ven. ...	33·5	45·2	57·0	68·7	80·1	91·2	102·3	112·6	122·6	131·8	140·2	147·0	151·5	152·0	150·0	144·0	138·6	135·9
	Sat. ...	223·1	222·7	222·1	221·5	220·7	219·9	219·1	218·5	217·9	217·3	217·1	216·9	216·8	217·1	217·4	217·8	218·6	219·4
	Eng. date .	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1928	Mars ...	309·9	317·7	325·2	332·9	340·4	347·9	355·1	2·4	9·0	16·7	23·6	30·3	36·6	42·7	48·7	54·2	58·4	64·0
	Merc. ...	342·1	0·2	19·1	37·9	55·3	69·0	78·3	77·9	70·7	69·6	79·3	92·5	109·3	126·2	145·6	162·7	178·4	190·1
	Jup ...	353·8	356·2	358·6	1·0	3·3	5·5	7·5	9·6	11·3	12·8	14·2	15·2	15·9	16·4	16·3	16·0	15·3	14·4
	Ven ...	338·2	350·5	2·9	15·1	27·4	39·6	52·0	64·2	76·4	88·9	101·0	113·2	125·4	137·8	150·0	162·4	174·7	187·1
	Sat. .	234·8	234·5	234·3	233·2	232·4	231·6	230·9	230·2	229·5	228·7	228·4	228·0	227·7	227·9	228·1	228·2	228·9	229·5
	Eng. date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1929	Mars ..	81·4	86·4	91·6	97·1	102·5	108·2	114·1	119·9	126·0	132·0	138·1	144·4	150·7	157·0	163·4	169·8	176·4	183·0
	Merc ...	356·5	15·2	32·7	48·0	58·3	60·0	53·1	50·1	57·2	70·8	87·4	105·3	123·7	141·6	157·8	171·1	178·1	175·6
	Jup. ...	21·5	23·8	26·2	28·6	31·0	33·4	35·8	38·1	40·3	42·4	44·4	46·2	47·9	49·4	50·5	51·4	51·9	52·1
	Ven ...	12·5	6·6	1·3	359·5	1·4	6·2	13·3	21·7	31·1	41·1	51·7	62·5	73·7	85·2	96·9	108·2	120·5	132·6
	Sat. .	246·1	245·8	245·5	245·1	244·4	243·7	242·9	242·1	241·3	240·6	240·1	239·6	239·1	239·0	238·9	238·9	239·4	239·9
1930	Mars ...	327·5	335·3	343·0	350·7	358·3	5·9	13·3	20·6	27·9	35·1	42·7	48·8	55·4	62·0	68·5	74·4	80·5	86·2
	Merc. ...	10·5	26·3	37·8	41·1	35·3	30·6	35·9	48·8	65·0	83·0	101·7	120·0	137·0	151·4	160·4	160·7	153·1	150·5
	Jup. ...	49·1	51·1	53·2	55·4	57·7	59·9	62·4	64·7	67·0	69·4	71·7	73·8	76·0	78·0	79·8	81·4	83·0	84·3
	Ven ...	16·3	28·5	40·8	52·9	65·1	77·1	89·1	100·9	112·7	124·3	135·8	147·3	158·5	169·5	180·3	190·4	199·9	208·7
	Sat. ...	257·1	256·9	256·7	256·6	255·9	255·3	254·7	254·0	253·2	252·4	251·8	251·2	250·5	250·3	250·1	249·8	250·1	250·4
1931	Mars ...	101·4	104·7	108·7	113·1	117·8	123·0	128·0	134·0	139·6	145·3	151·5	157·5	163·8	170·1	176·5	183·1	189·7	196·6
	Merc. ...	16·7	22·3	17·5	11·5	14·5	26·5	42·3	60·3	79·3	97·7	115·5	130·9	142·0	144·5	138·4	133·2	137·9	150·1
	Jup. ..	77·7	79·0	80·5	82·2	84·0	86·1	88·0	90·2	92·5	94·8	97·0	99·3	101·6	103·7	105·9	108·1	110·1	111·9
	Ven. .	322·2	334·1	346·1	358·1	10·2	22·3	34·5	46·6	58·8	70·9	83·0	95·3	107·5	119·8	132·1	144·4	156·9	169·4
	Sat ...	268·0	268·1	268·2	268·2	267·7	267·2	266·8	266·0	265·2	264·4	263·7	263·0	262·3	261·9	261·5	261·1	261·2	261·3
	Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1932	Mars ...	344·1	351·9	359·4	7·1	14·6	22·0	29·4	36·5	43·8	50·7	57·6	64·3	70·9	77·5	84·1	90·3	96·5	102·2
	Merc. ...	0·0	352·8	354·4	4·8	19·9	37·6	55·7	74·6	92·5	109·3	121·2	126·7	122·5	116·1	119·1	130·0	144·9	161·3
	Jup. .	108·1	108·3	108·9	109·7	110·9	112·2	113·8	115·6	117·4	119·4	121·6	123·8	125·9	128·1	130·4	132·6	134·7	136·9
	Ven ...	45·4	55·5	64·8	72·7	79·3	82·9	83·4	79·7	73·8	68·4	66·1	67·6	72·4	80·0	88·4	97·9	108·3	119·1
	Sat. ...	278·8	279·1	279·4	279·6	279·3	279·0	278·8	278·1	277·4	276·7	276·0	275·2	274·4	273·8	273·2	272·6	272·5	272·4
	Eng. date ..	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1933	Mars	127·9	128·7	130·7	133·1	136·7	140·6	145·1	150·0	155·2	160·6	166·4	172·2	178·4	184·7	191·1	197·6	204·5	211·2
	Merc.	334·8	343·2	357·4	15·1	33·7	52·7	71·2	88·2	101·5	108·8	106·2	99·2	99·8	109·5	123·9	140·7	158·5	176·1
	Jup .	140·4	139·6	139·2	138·9	139·3	139·8	140·6	141·7	143·0	144·4	146·2	148·1	150·0	152·1	154·2	156·4	158·2	160·8
	Ven. ..	351·8	10·2	22·5	34·9	47·2	59·4	71·7	83·8	95·9	108·1	120·2	132·4	144·4	156·3	168·4	180·4	192·3	203·9
	Sat. ...	289·8	290·2	290·5	291·1	291·0	290·9	290·3	290·2	289·6	289·1	288·3	287·5	286·8	286·1	285·4	284·7	284·4	284·1
1934	Mars ...	359·7	7·4	15·0	22·3	29·7	36·7	43·9	51·0	57·9	64·8	71·6	78·1	84·9	91·2	97·8	104·1	110·3	116·5
	Merc ...	335·7	352·4	10·4	29·4	48·3	65·6	80·4	89·5	89·2	81·8	80·2	88·5	102·4	119·2	137·0	154·9	172·2	187·6
	Jup. .	174·1	172·8	171·5	170·7	169·9	169·3	169·2	169·4	169·8	170·6	171·7	173·0	174·4	176·2	178·0	179·9	182·1	184·1
	Ven. ..	313·4	323·1	333·8	344·5	355·7	7·0	18·4	30·2	41·9	53·7	65·7	77·5	89·7	101·9	113·9	126·1	138·4	150·6
	Sat. ..	300·6	301·2	301·8	302·5	302·6	302·7	302·9	302·5	302·1	301·8	301·1	300·4	299·6	298·8	298·0	297·3	296·8	296·3
1935	Mars ...	168·4	165·3	163·6	162·8	163·2	164·9	167·6	171·1	175·0	179·6	184·7	190·1	196·0	201·8	208·0	214·7	221·3	228·1
	Merc. ...	348·1	6·7	25·5	43·2	58·8	69·5	71·2	64·6	61·0	67·9	81·0	97·3	115·2	133·5	151·4	166·6	180·6	187·4
	Jup. ...	208·2	207·1	205·8	204·5	203·1	202·0	201·0	200·1	199·6	199·4	199·5	200·0	200·8	201·9	203·1	204·7	206·3	208·2
	Ven. ...	34·1	45·8	57·5	69·1	80·5	91·7	102·4	112·9	122·6	131·6	139·8	145·9	149·2	149·6	146·4	140·6	135·0	133·4
	Sat. ...	311·5	312·3	313·1	314·0	314·4	314·8	315·1	314·9	314·7	314·6	314·0	313·4	312·8	312·0	311·2	310·3	309·6	308·9
	Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1936	Mars ...	14·9	22·1	29·4	36·5	43·5	50·7	57·5	64·4	71·2	77·8	84·5	91·2	97·5	104·1	110·4	116·9	123·3	129·2
	Merc. ...	2·7	20·8	36·6	48·5	52·3	46·4	41·7	46·8	58·9	75·1	93·0	111·6	129·7	146·7	161·1	170·1	170·1	163·2
	Jup. ...	241·3	241·2	240·5	239·7	238·7	237·4	236·0	234·6	233·4	232·3	231·4	230·9	230·7	230·7	231·3	231·9	232·9	234·2
	Ven ...	339·3	351·6	3·9	16·8	28·5	40·8	53·2	65·5	77·6	89·9	102·2	114·3	126·7	138·9	151·2	163·6	175·8	188·1
	Sat. ...	322·5	323·5	324·5	325·5	326·1	326·7	327·3	327·4	327·5	327·5	327·0	326·5	326·1	325·3	324·5	323·8	323·0	322·2
	Eng. date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1937	Mars ...	228·3	222·0	220·2	217·8	214·8	211·6	209·7	208·3	208·9	210·2	212·8	216·4	220·5	225·4	230·5	236·3	242·4	242·7
	Merc. ...	14·6	27·5	32·9	28·6	22·5	25·7	37·1	52·8	70·7	89·5	107·9	125·5	140·7	151·5	154·1	147·9	142·9	147·9
	Jup. ...	272·6	273·5	274·0	274·1	274·1	273·6	272·7	271·7	270·5	269·1	267·8	266·5	265·4	264·4	263·8	263·5	263·5	263·8
	Ven. ...	9·0	2·4	357·9	356·0	0·0	5·4	12·9	21·7	31·1	41·5	52·0	63·2	74·2	85·8	97·3	108·9	121·3	133·1
	Sat. ...	333·9	335·0	336·1	337·3	338·1	338·9	339·7	340·0	340·3	340·6	340·4	340·2	339·9	339·2	338·5	337·8	337·0	336·2
1938	Mars ...	29·7	36·8	43·5	50·3	57·2	64·0	70·7	77·3	83·7	90·4	96·9	103·4	109·8	116·2	122·6	128·9	135·2	141·7
	Merc. ...	13·4	11·2	4·2	4·9	15·2	30·8	48·1	66·8	85·7	103·6	119·8	132·4	137·3	133·0	126·4	128·7	139·8	154·3
	Jup. ...	301·9	303·6	305·2	306·5	307·5	308·3	308·6	308·7	308·4	307·8	307·0	305·8	304·4	303·1	301·8	300·5	299·4	298·7
	Ven. ...	16·9	29·1	41·5	53·7	65·7	77·7	89·5	101·5	113·2	124·9	136·3	147·7	159·0	169·9	180·5	190·4	200·9	208·0
	Sat. ...	345·3	346·5	347·7	349·0	350·0	351·0	352·0	352·6	353·2	353·7	353·7	353·7	353·7	353·2	352·7	352·1	351·3	350·5

Mesh.	Vrsb.	Mith.	Kat.	Sim.	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

V-B—cont.

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999, Saturn, A.D. 1617—A.D. 1999—cont.

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 8	Mr 18	Mr 28	Ap 7
177·1	183·6	190·3	197·1	203·8	210·8	217·6	224·7	231·8	**1928**	238·9	246·1	253·4	260·7	268·1	275·8	283·1	290·6	298·2	306·0
198·2	208·0	209·9	202·5	198·5	203·0	215·2	230·6	247·6		264·9	282·4	298·1	310·6	316·5	313·1	306·4	307·3	318·2	333·1
331·7	330·6	329·7	329·3	329·0	329·2	329·8	330·6	331·7		333·1	334·8	336·6	338·5	340·8	343·0	345·3	347·7	350·1	352·3
136·6	141·8	148·7	157·2	166·7	177·1	187·6	199·0	210·5		222·2	234·6	246·4	258·5	271·8	283·1	295·2	307·6	320·0	332·2
220·1	221·2	222·2	223·2	224·4	225·7	226·8	227·9	229·0		230·2	231·1	232·1	233·0	233·6	234·1	234·7	234·8	234·9	234·9
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 8	Mr 18	Mr 28	Ap 7
68·3	71·6	74·3	75·8	76·6	75·6	73·5	70·4	66·8	**1929**	63·2	61·1	59·9	60·1	61·4	63·6	65·9	70·4	74·7	79·0
194·5	189·6	183·2	185·6	196·2	210·5	226·9	244·4	261·6		277·4	291·1	298·7	297·3	289·8	288·6	297·5	310·7	328·3	346·8
13·2	11·9	10·5	9·1	7·9	6·9	6·3	5·6	5·6		5·9	6·5	7·4	8·6	10·1	11·7	13·6	15·7	17·8	20·0
199·4	211·7	224·3	236·2	248·4	260·5	272·8	284·7	296·6		308·2	319·7	330·8	341·2	351·4	0·5	8·4	14·7	18·0	18·0
230·1	231·1	232·1	233·1	234·3	235·5	236·6	237·7	238·8		240·0	241·0	242·0	243·3	243·8	244·5	245·2	245·5	245·8	246·0
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
189·8	196·6	203·4	210·5	217·5	224·7	231·9	239·1	246·5	**1930**	254·0	261·4	268·9	276·6	284·4	292·1	300·0	307·7	315·5	323·4
168·3	167·1	176·7	190·3	206·5	223·9	241·0	257·6	271·6		281·0	282·1	274·8	271·4	277·5	290·4	306·5	324·4	343·1	1·0
52·0	51·5	50·7	49·6	48·4	47·1	45·7	44·4	43·3		42·4	41·7	41·4	41·5	41·8	42·6	43·6	44·9	46·5	48·1
143·2	156·8	167·2	181·6	193·9	206·4	219·0	231·5	244·3		256·8	269·6	282·1	294·7	307·4	319·9	332·4	344·8	357·3	9·8
240·3	241·2	242·1	243·0	244·1	245·2	246·3	247·5	248·7		249·8	250·9	252·0	253·1	254·0	254·9	255·7	256·1	256·5	257·0
91·6	96·6	101·3	105·4	109·0	111·9	114·2	115·1	115·3	**1931**	113·9	111·3	107·8	103·8	100·4	97·6	96·4	96·4	97·7	99·9
157·4	170·3	186·3	203·4	220·8	237·3	252·2	263·1	266·4		260·8	255·0	258·5	270·0	285·3	302·5	320·7	338·9	356·2	10·9
85·2	86·0	86·3	86·3	86·0	85·4	84·4	83·2	82·0		80·6	79·3	78·1	77·0	76·2	75·8	75·6	75·8	76·3	77·2
215·9	221·0	223·5	222·1	217·1	211·1	207·7	208·5	212·9		219·6	227·8	237·5	247·4	258·3	269·3	280·8	292·3	304·1	315·8
250·7	251·4	252·1	252·9	253·9	254·9	256·0	257·2	258·4		259·6	260·8	262·0	263·1	264·0	264·9	265·9	266·5	267·1	267·8
																Mr 8	Mr 18	Mr 28	Ap 7
204·3	210·2	217·4	224·4	231·7	239·0	246·4	254·2	261·7	**1932**	269·4	277·1	284·9	292·7	300·6	308·5	316·3	324·3	332·1	340·0
165·6	182·7	200·1	217·1	232·5	244·9	250·5	247·1	239·8		240·6	250·4	264·5	281·1	299·0	317·1	334·2	339·6	0·5	8·0
113·7	115·2	116·4	117·5	118·3	118·7	118·7	118·5	118·0		117·1	116·1	114·8	113·5	112·2	111·0	109·8	108·9	108·4	108·1
181·6	194·1	206·7	219·1	231·6	244·2	256·7	269·2	281·8		294·2	306·6	318·7	331·0	343·0	354·8	6·4	17·9	29·2	39·9
261·4	261·9	262·4	263·0	264·0	265·0	265·9	267·1	268·3		269·4	270.5	271·8	272·9	274·0	275·1	276·2	277·0	277·8	278·5
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 8	Mr 18	Mr 28	Ap 7
108·3	114.1	119·5	124·7	129·5	134·2	138·2	141·7	144·7	**1933**	146·6	147·7	147·3	145·7	143·1	139·0	135·7	132·3	129·3	128·4
178·5	196·8	212·9	226·2	234·3	233·5	226·3	223·2	230·3		244·3	260·3	277·9	295·7	313·1	328·6	340·1	344·8	339·5	333·6
139·0	140·9	142·8	144·5	146·0	147·2	148·4	149·7	149·6		149·7	149·5	149·0	148·3	147·2	145·9	144·7	143·4	142·1	140·9
130·1	141·5	153·2	165·0	177·0	189·0	201·3	213·5	225·9		238·3	251·0	263·6	276·0	288·6	301·0	313·7	326·0	338·6	351·0
272·3	272·7	273·1	273·5	274·4	275·3	276·1	276·9	277·9		278·4	279·6	280·8	281·9	283·0	284·2	285·4	286·5	287·5	288·5
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
218·1	225·3	232·4	239·8	247·1	254·8	262·4	270·0	277·8	**1934**	285·5	293·4	301·4	309·2	317·0	324·8	332·8	340·6	348·0	356·0
193·0	207·4	217·3	215·9	212·1	207·5	212·5	224·6	239·8		257·0	274·5	292·0	307·8	320·5	326·7	323·1	316·4	317·7	328·1
163·0	165·1	167·2	169·2	171·2	173·0	174·7	176·2	177·5		178·6	179·3	179·7	179·9	179·7	179·1	178·2	177·3	176·1	174·7
215·7	227·3	238·6	249·6	260.2	270·5	279·9	288·3	295·0		299·1	300·0	[illegible]	291·1	285·6	284·4	286·8	292·1	299·4	308·3
283·8	284·0	284·2	284·5	285·2	286·9	286·7	287·7	288·7		289·8	291·0	292·2	293·4	294·6	295·8	296·9	298·0	299·1	300·1
122·5	128·4	134·2	139·9	145·5	150·8	156·1	160·7	165·5	**1935**	169·9	173·5	176·8	179·3	180·5	181·0	180·2	177·8	174·3	170·2
199·3	203·6	198·7	192·4	194·6	204·9	219·5	236·2	253·6		270·9	287·3	300·7	308·4	307·3	299·9	298·8	307·0	321·4	338·4
186·3	188·6	190·7	192·8	195·0	197·2	199·3	201·2	203·1		204·8	206·3	207·7	208·7	209·4	209·9	210·1	209·9	209·4	208·7
163·2	175·7	188·0	200·6	213·2	225·8	238·3	250·9	263·7		276·2	288·9	301·6	314·1	326·5	338·9	351·3	3·4	15·7	27·7
295·8	295·8	295·8	295·8	296·3	296·8	297·4	298·4	299·4		300·3	301·5	302·7	303·8	305·0	306·2	307·5	308·7	309·9	311·0
																Mr 8	Mr 16	Mr 28	Ap 7
235·1	242·1	249.5	256·7	264·2	271·6	279·3	287·1	294·7	**1936**	302·5	310·3	318·0	325·6	333·4	341·2	348·6	356·1	3·8	11·0
185·5	177·5	176·9	185·9	199·5	215·8	233·0	250·5	266·8		281·1	290·8	291·4	284·7	280·0	287·4	300·2	316·3	334·3	353·0
210·2	212·8	214·4	216·6	218·9	221·1	223·2	225·6	227·7		229·8	231·7	233·8	235·5	237·1	238·5	239·6	240·4	241·1	241·3
135·2	140·9	148·3	157·1	166·8	177·1	188·0	199·5	210·9		222·7	234·9	246·7	258·9	271·3	283·5	295·8	308·2	320·5	332·8
308·3	308·1	307·9	307·7	308·0	308·3	308·7	309·5	310·3		311·2	312·3	313·4	314·5	315·7	316·9	318·2	319·4	320·6	321·9
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 8	Mr 18	Mr 28	Ap 7
135·5	141·5	147·7	153·6	159·6	165·4	171·2	176·9	182·4	**1937**	188·0	193·3	198·1	203·1	209·5	211·6	215·8	218·5	220·7	222·1
159·8	166·9	179·6	195·3	212·4	229·9	246·4	261·4	272·5		275·7	269·7	264·4	[illegible]	279·3	294·8	312·3	330·7	349·0	6·0
235·8	237·4	239·3	241·4	243·4	245·6	247·8	250·2	252·4		254·6	257·0	259·2	261·4	263·6	265·5	267·4	269·1	270·6	271·9
200·3	212·7	224·9	237·2	249·3	261·5	273·5	285·5	297·4		308·9	320·2	331·1	341·5	351·0	359·6	6·9	12·0	13·7	12·3
321·5	321·1	320·7	320·2	320·3	320·4	320·5	321·1	321·7		322.4	323·5	324·6	325·6	326·8	328·0	329·2	330·5	331·8	333·0
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
255·3	262·1	269·1	276·2	283·4	290·9	298·2	305·7	313·1	**1938**	320·5	328·0	335·4	342·8	350·2	357·3	4·7	11·8	18·9	26·0
159·6	174·9	192·0	209·4	226·4	241·8	253·9	259·6	256·0		248·9	250·0	259·6	273·9	291·0	308·8	327·2	344·4	359·8	10·9
264·6	265·5	266·7	268·4	270·0	271·9	274·0	276·1	278·2		280·6	282·9	285·2	287·6	290·0	292·3	294·6	296·9	298·9	300·9
145·4	157·4	169·9	182·2	194·7	207·1	219·6	232·1	244·8		257·5	270·2	282·8	295·3	308·1	320·5	333·1	345·4	357·9	10·4
335·4	334·8	334·2	333·6	333·5	333·4	333·2	333·7	334·2		334·7	335·5	336·3	337·1	338·3	339·5	340·7	342·0	343·3	344·6
147·8	154·2	160·3	166·6	172·8	179·1	185·3	191·3	197·4	**1939**	203·7	209·8	215·9	222·7	227·9	233·8	239·6	245·2	250·8	256·1
171·1	188·6	206·1	222·1	235·6	243·1	242·2	234·7	232·5		239·9	253·7	269·9	287·4	305·3	323·0	338·6	350·7	355·1	350·5
293·2	294·0	296·2	[illegible]	299·6	300·9	302·2	303·8	305·7		307·7	309·8	312·0	314·4	316·8	319·1	321·6	324·0	326·4	328·7
215·0	219·6	220·7	218·7	212·9	207·5	204·9	206·6	211·9		218·8	227·8	237·5	247·7	258·6	269·7	281·1	292·7	304·5	316·5
349·3	349·0	348·2	347·4	347·0	346·6	346·3	346·5	346·7		347·0	347·7	348·4	349·1	350·2	351·3	352·4	353·7	355·0	356·3

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Savti.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Śrav.	Dan.	Satab.	P. Bhad.	U. Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle.
Venus, A.D. 1765—A.D. 1999;

Year	Day of I S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ..	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1939	Mars .	258·7	263·6	268·3	272·5	276·2	279·1	280·8	281·9	282·0	280·5	277·7	275·6	269·8	272·9	272·8	274·2	277·0	280·9
	Merc. .	346·6	344·9	353·0	7·7	25·1	43·7	62·8	81·1	98·3	112·0	119·3	117·3	109·7	109·6	119·4	133·5	150·2	167·9
	Jup. ..	330·0	332·2	334·4	336·4	338·4	340·0	341·6	342·8	343·8	344·5	344·8	344·7	344·4	343·6	342·6	341·4	340·1	338·7
	Ven. ...	322·7	334·6	346·6	358·7	10·9	22·9	35·1	47·2	59·4	71·5	83·6	96·0	108·3	120·5	132·7	145·2	157·5	170·0
	Sat. ..	356·9	358·2	359·5	0·8	2·0	3·2	4·3	5·1	5·9	6·7	7·0	7·3	7·6	7·3	7·0	6·7	6·0	5·3
	Eng. date ...	Ap 12	Ap 22	My 2	My 12	My 22	Je 1	Je 11	Je 21	Jl 1	Jl 11	Jl 21	Jl 31	Au 10	Au 20	Au 30	S 9	S 19	S 29
1940	Mars ..	44·4	50·9	57·4	64·0	70·5	76·9	83·4	89·6	96·3	102·6	109·0	115·2	121·6	128·0	134·4	140·9	147·1	153·5
	Merc.	332·8	345·6	2·5	20·8	40·0	58·8	76·1	90·9	100·2	99·7	92·5	90·6	98·8	112·4	129·0	146·5	164·5	181·7
	Jup. ...	357·6	0·0	2·4	4·8	7·0	9·4	11·5	13·5	15·5	17·0	18·5	19·7	20·0	21·1	21·3	21·2	20·7	19·9
	Ven. ..	45·6	55·6	64·6	72·2	78·0	80·7	80·2	76·6	69·9	65·2	63·8	66·7	71·5	79·6	88·7	98·3	108·5	119·2
	Sat. ...	8·8	10·1	11·4	12·7	14·0	15·3	16·6	17·6	18·6	19·6	20·2	20·8	21·4	21·4	21·3	21·3	20·8	20·3
	Eng. date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1941	Mars ...	283·0	289·0	296·4	303·2	309·8	316·3	322·5	328·5	334·3	339·8	344·6	348·8	352·1	354·5	355·7	355·5	353·9	351·2
	Merc. .	340·1	358·2	16·9	35·8	53·8	69·2	80·0	82·0	75·4	71·8	78·1	91·0	107·5	125·0	143·8	160·8	177·0	189·9
	Jup. ...	25·3	27·6	29·9	32·3	34·7	37·1	39·4	41·8	44·1	46·2	48·3	50·3	51·9	53·5	54·7	55·8	56·5	56·8
	Ven. ...	358·3	10·8	23·0	35·4	47·7	59·9	72·3	84·4	96·5	108·7	120·7	132·9	144·9	156·9	168·9	180·9	192·7	204·3
	Sat. ..	21·1	22·4	23·7	25·1	26·4	27·7	29·1	30·3	31·5	32·6	33·4	34·2	34·9	35·2	35·5	35·8	35·5	35·2
1942	Mars ...	59·1	65·2	71·3	77·4	83·5	89·7	96·0	102·2	108·3	114·7	121·0	127·3	133·6	139·9	146·3	152·7	159·2	165·6
	Merc ...	354·4	12·9	31·2	47·2	59·3	63·4	58·1	52·6	57·1	69·4	85·4	103·3	121·7	139·9	156·4	170·7	179·4	179·7
	Jup. ...	53·0	54·4	56·9	59·1	61·3	63·5	65·4	68·2	70·6	72·9	75·2	77·4	79·5	81·6	83·6	85·3	86·9	88·3
	Ven. ...	313·2	323·2	333·8	344·7	356·2	7·4	19·1	30·8	42·5	54·4	66·3	78·2	90·3	102·4	114·4	126·7	139·1	151·4
	Sat .	33·5	34·8	36·1	37·5	38·8	40·1	41·5	42·8	44·1	45·3	46·4	47·5	48·7	49·1	49·1	50·0	50·0	49·9
1943	Mars ...	302·7	310·1	317·7	325·1	332·7	340·0	347·5	354·4	1·5	8·4	14·9	21·2	27·4	33·2	38·8	43·7	48·0	51·9
	Merc. ...	8·5	25·1	38·3	45·0	40·4	33·9	30·6	47·5	63·0	81·0	99·8	117·8	135·4	150·6	161·4	164·0	157·9	152·8
	Jup. ...	81·8	83·0	84·8	85·8	87·6	89·5	91·6	93·7	95·9	98·2	100·5	102·6	104·9	107·2	109·4	111·5	113·6	115·5
	Ven. .	34·5	46·3	58·1	69·6	81·0	92·0	102·5	113·0	122·8	131·5	139·2	144·8	147·4	147·5	143·6	136·7	132·2	131·4
	Sat. ...	46·4	47·7	49·0	50·2	51·5	52·8	54·1	55·4	56·7	58·1	59·3	60·5	61·7	62·5	63·3	64·1	64·4	64·7
1944	Mars ...	74·8	80·2	85·7	91·4	97·2	103·0	108·9	114·9	120·8	126·9	133·1	139·4	145·7	152·1	158·4	165·0	174·4	178·0
	Merc. ...	16·7	24·3	22·3	15·1	15·8	25·7	40·7	58·4	77·1	95·4	113·4	129·7	142·4	147·2	142·6	136·3	138·7	148·9
	Jup. ...	112·4	112·5	112·9	113·7	114·8	116·0	117·6	119·2	121·0	123·0	125·1	127·2	129·6	131·6	133·8	136·0	138·2	140·4
	Ven. ...	339·9	352·2	4·6	17·1	29·4	41·6	53·8	66·0	78·4	90·6	102·8	115·2	127·3	139·6	151·8	164·2	176·4	188·9
	Sat. ..	59·5	60·6	61·7	62·8	64·1	65·4	66·7	68·0	69·4	70·8	72·1	73·4	74·6	75·6	76·6	77·6	78·1	78·6
	Eng date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1945	Mars ..	320·7	328·5	336·3	344·1	351·5	359·1	6·6	13·9	21·1	28·2	35·3	41·9	48·7	55·2	61·3	67·4	73·1	78·6
	Merc. ..	4·7	357·1	355·7	3·9	18·4	35·6	54·0	73·2	91·5	108·4	121·9	129·4	127·1	119·7	120·0	128·8	143·4	160·6
	Jup ...	145·0	144·1	143·6	143·2	143·3	143·7	144·4	145·3	146·6	148·0	149·6	151·4	153·4	155·3	157·4	159·6	161·7	163·9
	Ven ...	5·2	358·8	354·9	355·1	358·8	4·8	12·7	21·7	31·3	41·5	52·4	63·3	74·7	86·2	98·0	108·8	121·7	133·7
	Sat. .	72·8	73·7	74·6	75·5	76·7	77·9	79·1	80·5	81·9	83·2	84·5	85·8	87·2	88·3	89·6	90·6	91·4	92·2
1946	Mars ...	93·1	97·2	101·7	106·5	111·9	117·0	122·7	128·1	134·0	140·1	145·9	152·2	158·5	164·7	171·1	177·7	184·5	191·1
	Merc ...	336·4	342·5	355·9	12·7	31·3	50·4	69·1	86·6	101·2	110·5	110·9	108·5	101·1	108·6	122·4	138·7	156·3	174·1
	Jup ...	178·8	177·5	176·2	175·2	174·1	173·7	173·3	173·4	173·7	174·4	175·3	176·5	177·9	179·5	181·4	183·3	185·2	187·4
	Ven ...	17·5	29·8	42·1	54·1	66·3	78·2	90·1	101·8	113·7	125·2	136·8	148·1	159·1	169·9	180·3	190·4	199·4	207·4
	Sat. ...	86·3	87·0	87·7	88·3	89·4	90·5	91·6	92·6	94·2	95·4	96·7	98·0	99·4	100·7	102·0	103·2	104·2	105·2
1947	Mars ...	337·7	345·4	353·2	0·9	8·5	16·0	23·3	30·6	37·7	44·9	51·6	58·4	65·3	71·7	78·1	84·3	90·5	96·6
	Merc. ...	334·4	350·3	8·3	27·1	48·1	64·1	79·7	90·8	93·0	86·4	82·4	88·6	101·0	117·2	134·7	152·9	170·6	186·5
	Jup.	212·9	211·8	210·6	209·3	207·9	206·6	205·7	204·7	204·0	203·7	203·7	204·0	204·7	205·6	206·8	208·2	209·9	211·6
	Ven. ..	323·2	335·2	347·3	359·4	11·4	23·7	35·8	48·0	60·1	72·2	84·5	96·6	108·9	121·2	133·5	145·9	158·3	170·7
	at. ...	100·1	100·5	100·9	101·3	102·2	103·1	103·9	105·1	106·3	107·5	108·8	110·1	111·4	112·7	114·0	115·3	116·4	117·5
1948	Mars ...	116·6	118·5	121·2	124·6	128·6	133·2	138·1	143·4	148·8	154·4	160·2	166·1	172·5	178·6	185·2	191·7	198·5	205·4
	Merc. ...	345·7	4·3	23·2	41·4	57·7	70·3	74·6	69·2	63·5	68·2	79·4	95·3	113·0	131·2	149·1	166·0	180·1	189·0
	Jup	245·8	245·6	245·1	244·4	243·4	241·9	240·9	239·6	238·3	237·2	236·2	235·5	235·1	235·2	235·3	236·0	237·0	238·2
	Ven. ...	45·5	55·3	64·0	71·3	76·5	79·1	77·3	72·4	66·0	61·9	61·8	65·4	71·4	78·4	88·4	98·2	108·6	119·6
	Sat ...	114·0	114·1	114·2	114·4	115·1	115·8	116·4	117·5	118·6	119·6	120·9	122·2	123·4	124·7	126·0	127·3	128·5	129·7
1949	Mars ..	353·7	1·3	9·0	16·4	23·8	31·1	38·4	45·5	52·5	59·4	66·3	73·0	79·6	86·2	92·5	98·9	105·1	111·3
	Merc. ...	0·6	19·0	35·5	48·8	55·0	51·7	45·1	47·2	58·1	73·4	91·0	109·6	127·7	145·0	160·4	171·0	175·7	167·2
	Jup. ...	276·7	277·6	278·4	278·8	278·8	278·5	277·9	276·9	275·7	274·5	273·1	271·8	270·6	269·5	268·7	268·3	268·2	268·3
	Ven ...	359·1	11·5	23·7	36·2	48·5	60·6	73·0	85·0	97·2	109·3	121·4	133·6	145·4	157·6	169·4	181·4	193·3	204·9
	Sat. ...	127·9	127·7	127·5	127·4	127·8	128·2	128·7	129·6	130·5	131·3	132·5	133·7	134·9	136·2	137·5	138·7	139·9	141·2
1950	Mars ...	150·1	148·7	148·6	149·2	151·5	154·1	157·7	162·0	166·4	171·6	176·9	182·7	188·5	194·7	201·0	207·7	214·4	221·2
	Merc. ...	13·4	27·4	35·0	33·8	26·4	26·5	36·0	51·1	68·7	87·4	105·6	123·8	139·9	152·0	157·0	153·8	146·1	147·9
	Jup ...	305·8	307·6	309·3	310·7	311·9	312·8	313·4	313·6	313·5	313·1	312·3	311·4	310·1	308·6	307·3	306·0	304·8	303·9
	Ven. ...	313·2	323·5	334·1	345·2	356·4	7·9	19·5	31·3	43·0	55·0	66·8	78·7	91·0	102·9	115·1	127·8	139·7	152·0
	Sat.	141·6	141·2	140·8	140·5	140·7	140·9	141·0	141·7	142·4	143·0	144·1	145·1	146·2	147·4	148·6	149·9	151·2	152·5

Mesh.	Vrsh.	Mith.	Kat.	Sim.	Kan	Tul.	Vrsch.	Dhan.	Mak.	Kum	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

V-B—cont.

Mars, A.D. 1637—A.D. 1999, Mercury, A.D. 1645—A.D. 1999, Jupiter, A.D. 1656—A.D. 1999, Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 8	Mr 18	Mr 28	Ap 7
285·3	290·2	296·0	301·7	307·9	314·1	320·5	327·4	334·0	**1940**	340·5	347·3	354·1	0·7	7·6	14·2	20·8	27·5	34·2	40·8
185·5	202·2	216·4	226·3	227·8	221·1	216·5	221·7	238·5		249·0	266·2	284·6	301·4	317·5	330·3	336·7	333·9	327·0	327·6
337·3	336·2	335·2	334·4	334·1	334·1	334·4	334·1	336·2		337·4	338·9	340·7	342·6	344·6	346·9	349·1	351·5	353·8	356·3
182·6	194·7	207·4	219·7	232·3	244·8	257·4	269·8	282·4		294·6	307·0	319·3	331·4	343·5	355·2	6·9	18·3	29·4	40·1
4·6	3·8	3·0	2·1	1·5	0·9	0·3	0·2	0·1		0·1	0·6	1·1	1·6	2·5	3·4	4·4	5·6	6·8	8·1
O 9	O 19	O 29	N 8	N 18	N 28	D 8	D 18	D 28		Ja 7	Ja 17	Ja 27	F 6	F 16	F 26	Mr 8	Mr 18	Mr 28	Ap 7
159·9	166·3	173·0	179·2	185·6	192·3	198·9	205·3	212·0	**1941**	218·4	225·2	232·0	238·7	245·3	252·0	258·8	265·7	272·7	279·5
197·0	208·6	212·7	207·6	201·5	203·4	214·0	228·6	245·3		263·0	280·3	296·8	310·3	318·6	317·4	310·1	308·5	317·4	331·2
18·9	17·6	16·2	14·8	13·5	12·4	11·4	10·9	10·5		10·7	11·1	11·9	12·9	14·3	15·9	17·6	19·5	21·7	23·9
130·4	141·8	153·5	165·4	177·3	189·6	201·8	214·1	226·4		239·1	251·7	264·3	276·7	289·3	301·8	314·4	326·8	339·3	351·8
19·7	18·9	18·1	17·2	16·5	15·8	15·0	14·6	14·2		13·9	14·1	14·3	14·6	15·4	16·2	16·9	18·0	19·1	20·8
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
349·7	346·2	345·4	345·6	347·2	349·5	352·6	356·4	0·5	**1942**	5·2	10·2	15·4	20·9	26·5	30·0	38·0	44·1	49·9	55·8
196·4	194·1	186·5	186·4	195·0	208·7	229·9	242·1	259·8		276·2	290·5	300·1	301·3	294·3	290·8	296·8	309·8	326·3	344·4
56·9	56·7	56·0	55·1	53·8	52·5	51·5	49·9	48·6		47·5	46·8	46·3	46·1	46·5	47·0	47·8	49·0	50·4	52·4
216·1	227·5	238·8	249·8	260·3	270·3	279·4	287·4	293·5		297·2	297·0	292·6	286·8	282·5	281·9	285·3	291·3	299·1	308·1
34·8	34·1	33·4	32·6	31·8	31·0	30·1	29·5	28·9		28·4	28·1	28·3	28·3	28·8	29·3	29·9	30·9	31·9	32·9
172·0	178·7	185·4	192·0	198·7	205·5	212·8	219·1	226·8	**1943**	233·1	240·1	247·4	254·5	261·8	269·0	276·6	284·0	291·3	299·0
172·3	169·1	175·8	188·8	204·7	221·6	238·9	255·9	270·8		281·6	285·1	279·6	273·8	277·6	289·1	304·6	322·4	340·7	359·0
89·4	90·2	90·8	90·9	90·7	90·2	89·5	88·4	87·1		85·8	84·5	83·2	82·1	81·1	80·5	80·2	80·3	80·6	81·8
163·9	176·1	188·7	201·2	213·7	226·3	239·0	251·5	264·2		277·0	289·4	302·2	314·7	327·2	339·5	351·8	3·9	16·2	28·3
49·9	49·3	48·7	48·2	47·4	46·6	45·7	45·0	44·3		43·5	43·2	42·9	42·5	42·8	43·1	43·3	44·1	44·9	45·7
																Mr 8	Mr 18	Mr 28	Ap 7
54·7	56·6	57·5	56·8	55·0	51·9	48·9	45·9	43·7	**1944**	42·9	43·1	44·5	47·0	49·9	53·7	57·5	62·2	67·0	72·0
157·5	169·0	184·8	201·2	218·5	235·7	251·0	263·4	270·1		265·5	258·2	259·3	269·0	283·4	300·5	318·7	337·1	354·6	10·2
117·3	118·9	120·3	121·3	122·2	122·9	123·0	123·0	122·6		121·9	120·9	119·7	118·4	117·1	115·8	114·7	113·6	112·9	112·6
131·0	140·5	148·1	157·1	166·8	177·5	188·2	199·8	211·3		223·2	235·3	247·2	259·6	271·7	284·1	296·4	328·7	321·0	333·5
64·9	64·6	64·3	63·9	63·2	62·5	61·7	60·9	60·1		59·2	58·6	58·0	57·4	57·1	57·3	57·3	57·9	58·5	59·0
																Mr 9	Mr 19	Mr 29	Ap 8
184·6	191·3	198·2	205·1	212·2	219·2	226·1	233·4	240·7	**1945**	248·1	255·3	262·7	270·3	277·9	285·7	293·3	301·1	309·0	316·7
163·9	180·4	197·8	215·2	231·1	244·4	252·3	251·5	243·3		241·6	249·6	262·8	279·1	296·8	314·9	332·6	348·7	1·1	6·0
142·4	144·5	146·4	148·1	149·6	151·0	152·2	153·0	153·7		153·9	153·8	153·5	152·8	151·8	150·5	149·3	147·9	146·6	145·6
200·6	213·3	225·5	237·7	250·1	262·2	274·2	286·0	297·8		310·1	320·5	331·1	341·4	350·8	359·3	5·8	10·0	11·1	7·7
79·1	79·1	79·0	79·0	78·4	77·8	77·3	76·4	75·5		74·7	74·0	73·3	72·5	72·2	71·9	71·6	71·9	72·2	72·5
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
88·7	88·2	92·4	95·9	98·8	100·8	101·5	101·0	99·5	**1946**	96·5	92·4	88·8	85·8	83·3	82·9	83·4	85·2	87·9	91·1
177·4	194·8	211·4	225·5	235·8	240·7	229·7	225·4	230·5		242·8	258·6	275·8	293·7	311·0	327·2	340·4	317·2	344·3	337·1
166·2	168·3	170·4	172·5	174·5	176·4	178·1	179·8	181·1		182·2	183·1	183·7	183·9	183·9	183·6	182·9	181·8	180·8	179·5
145·9	158·1	170·6	183·0	195·3	207·8	220·3	232·9	246·2		258·3	270·7	283·5	296·0	308·8	321·3	333·8	346·2	358·6	11·0
92·9	93·1	93·3	93·6	93·3	93·0	92·6	91·8	91·0		90·3	89·5	88·7	87·8	87·3	86·8	86·2	86·2	86·1	86·1
197·8	204·7	211·7	219·0	226·2	233·3	240·7	248·1	255·7	**1947**	263·2	270·8	278·6	286·4	294·2	302·1	309·9	317·8	325·8	333·6
191·2	206·2	217·7	221·7	216·7	210·3	212·5	223·1	238·0		254·7	272·5	289·7	306·3	320·1	328·3	327·8	320·3	318·9	327·0
189·5	191·7	193·9	196·1	198·3	200·4	202·6	204·6	206·5		208·3	209·9	211·2	212·4	213·3	214·0	214·2	214·3	213·[illegible]	213·3
213·8	217·7	218·4	214·7	208·9	203·7	202·5	205·1	210·9		218·4	227·5	237·2	247·8	258·6	269·9	281·6	293·2	304·9	316·8
106·1	106·6	107·1	107·5	107·5	107·4	107·4	106·8	106·2		105·5	104·7	103·9	103·0	102·3	101·6	100·9	100·6	100·3	100·0
																Mr 8	Mr 18	Mr 28	Ap 7
102·1	107·7	113·0	117·8	122·5	126·8	130·0	132·6	134·5	**1948**	135·4	135·0	133·7	130·2	126·6	122·7	119·2	117·1	115·9	115·8
199·8	205·7	203·2	195·6	195·2	204·2	217·7	233·9	251·4		269·0	285·7	300·2	301·9	311·1	304·6	300·4	307·1	319·8	336·3
213·5	215·5	217·7	220·0	222·1	224·4	226·6	228·8	231·1		233·2	235·3	237·2	239·1	240·7	242·2	243·5	244·5	245·2	245·7
183·2	195·4	208·1	220·4	233·0	245·5	258·1	270·6	282·9		295·4	307·7	319·9	331·9	344·0	355·9	7·4	18·9	29·9	40·5
118·7	119·4	120·1	120·8	121·0	121·2	121·4	120·0	120·6		120·8	119·6	118·9	118·1	117·3	116·5	115·6	115·1	114·6	114·0
																Mr 9	Mr 19	Mr 29	Ap 8
212·3	219·1	226·3	233·6	241·1	248·5	256·0	263·7	271·2	**1949**	279·1	286·9	294·7	302·7	310·6	318·4	326·2	334·1	342·0	349·7
166·8	181·1	178·6	186·1	197·6	213·8	230·6	248·1	265·0		280·3	291·5	294·8	289·0	283·5	287·6	298·6	314·8	331·9	350·6
239·6	241·8	243·1	245·0	247·1	249·3	251·5	253·8	256·1		258·4	260·6	263·0	265·2	267·3	269·4	271·4	273·1	274·7	276·1
130·9	142·4	154·2	166·1	178·0	190·3	202·3	214·9	227·2		239·8	252·3	264·9	277·3	289·8	302·6	314·9	327·6	340·0	352·3
130·8	131·7	132·6	133·5	134·0	131·5	134·9	134·8	134·7		134·5	133·8	133·1	132·5	131·7	130·9	130·1	129·4	128·7	128·1
117·3	123·0	128·9	134·3	139·7	144·8	149·5	154·1	158·0	**1950**	161·5	164·5	166·5	167·5	167·1	165·2	162·6	158·9	155·0	151·2
162·1	166·7	178·8	193·6	210·5	227·8	244·8	260·3	272·4		278·1	274·6	267·5	268·7	278·4	293·2	310·5	328·5	346·9	4·7
268·8	269·7	270·9	272·2	273·9	275·6	277·6	279·7	282·0		284·1	286·4	288·9	291·2	293·5	296·0	298·3	300·5	302·7	304·7
216·5	227·9	239·2	249·9	260·4	270·1	279·2	286·6	292·2		294·6	293·4	288·8	280·9	279·0	280·0	283·8	290·6	298·7	308·1
142·5	143·5	144·5	145·5	146·7	146·9	147·5	147·6	147·7		147·8	147·4	147·0	146·6	145·8	145·0	144·3	143·5	142·7	141·9
228·1	235·2	242·4	249·9	257·3	265·0	272·6	280·1	288·0	**1951**	295·8	303·6	311·5	319·2	327·2	334·8	342·5	350·1	357·8	5·2
158·7	173·2	190·0	207·1	224·5	240·6	253·8	261·3	260·2		252·7	251·0	258·4	272·4	288·8	306·8	324·9	342·8	358·7	11·5
303·8	302·9	302·9	303·4	304·1	305·1	306·3	307·9	309·7		311·6	313·7	315·9	318·1	320·6	322·9	325·8	327·7	330·2	332·5
164·5	177·0	189·3	201·9	214·5	227·1	239·6	252·2	265·0		277·6	290·2	302·8	315·2	327·7	340·2	352·3	4·6	16·6	28·8
153·7	154·8	156·9	157·0	157·8	158·6	159·4	159·8	160·2		160·5	160·3	160·1	159·9	159·3	158·7	158·0	157·2	156·4	155·5

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Śrav.	Dan.	Satab	P. Bhad.	U Bhad	Revati
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle. Venus, A.D. 1765—A.D. 1999;

Day of I.S Y		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1951	Mars ..	9·1	16·5	23·9	31·0	38·3	45·3	52·2	59·3	66·2	72·8	79·5	86·0	92·8	99·2	105·5	111·9	118·1	124·4
	Merc. ..	14·7	15·6	8·4	6·3	14·8	28·7	45·8	64·4	83·3	101·6	118·4	132·0	139·4	137·2	131·2	129·9	139·0	152·6
	Jup .	333·8	336·0	338·3	340·4	342·4	344·2	345·7	347·2	348·3	349·1	349·8	349·8	349·7	349·1	348·3	347·0	345·8	344·5
	Ven. ...	35·1	46·9	58·6	70·0	81·4	92·3	103·0	113·0	122·7	131·0	138·3	143·5	145·1	144·5	139·8	133·2	129·1	129·6
	Sat	155·2	154·6	154·0	153·4	153·3	153·3	153·2	153·7	154·2	154·6	155·5	156·4	157·3	158·4	159·5	160·6	161·9	163·2
1952	Mars	202·2	199·3	195·7	192·7	189·1	188·7	188·9	190·2	192·6	195·8	199·8	204·3	209·5	214·8	220·8	227·0	233·4	240·1
	Merc. ..	351·0	347·2	353·4	6·1	23·1	41·6	60·5	79·2	96·7	111·7	121·1	120·9	113·8	111·2	119·0	131·9	118·3	165·6
	Jup. ..	1·6	4·0	6·4	8·9	11·2	13·4	15·6	17·7	19·6	21·3	22·9	24·2	25·2	25·9	26·2	26·3	25·9	25·8
	Ven	340·6	353·0	5·2	17·7	30·0	42·2	54·4	66·7	79·0	91·3	103·4	115·8	127·9	140·2	152·4	164·8	177·1	189·8
	Sat ..	168·5	167·8	167·1	166·4	166·1	165·8	165·5	165·7	165·9	166·1	166·9	167·7	168·4	169·5	170·6	171·6	172·8	174·0
1953	Mars ...	24·0	31·0	38·0	45·0	51·8	58·8	65·6	72·2	78·9	85·5	92·2	98·5	105·0	111·5	117·8	124·3	130·6	136·8
	Merc ..	332·7	344·7	0·6	18·8	37·6	56·6	74·5	90·1	101·2	103·7	97·3	92·9	98·4	111·0	127·0	144·5	162·8	180·0
	Jup. ..	29·1	31·3	33·6	36·1	38·4	40·8	43·2	45·5	47·7	50·0	52·1	54·1	55·8	57·6	58·9	60·1	61·0	61·5
	Ven ..	1·2	355·0	352·1	353·3	357·8	4·0	12·8	21·5	31·5	41·8	52·6	63·6	75·2	86·6	98·3	110·3	122·3	134·8
	Sat	181·4	180·6	179·8	179·1	178·6	178·1	177·6	177·6	177·6	177·6	178·1	178·6	179·2	180·1	181·0	181·9	183·1	184·3
1954	Mars ...	246·6	250·1	252·9	254·8	256·1	255·8	254·6	252·1	249·5	247·0	245·3	243·8	246·1	248·3	251·6	255·6	260·6	265·9
	Merc ..	338·3	356·0	14·6	33·7	52·0	68·5	80·6	85·4	80·4	74·5	78·5	90·0	105·5	123·0	141·0	159·1	175·7	189·6
	Jup .	56·9	58·6	60·6	62·7	64·9	67·1	69·5	71·7	74·1	76·4	78·6	80·9	83·2	85·2	87·2	89·1	90·8	92·2
	Ven ..	18·1	30·5	42·7	54·6	66·8	79·0	90·7	102·5	114·1	125·7	137·0	148·5	159·5	170·3	180·4	190·2	199·2	206·8
	Sat .	194·0	193·2	192·4	191·6	191·0	190·4	189·7	189·5	189·3	189·0	189·3	189·6	190·0	190·8	191·6	192·3	193·4	194·5
1955	Mars .	38·6	45·2	52·0	58·6	65·4	71·9	78·4	85·0	91·4	98·0	104·4	110·7	117·1	123·4	130·0	136·2	142·5	148·9
	Merc	351·9	11·1	29·1	46·2	59·8	66·1	62·9	56·0	58·1	68·2	83·7	100·9	119·1	137·5	154·7	169·9	180·6	182·8
	Jup ..	85·8	86·9	88·1	89·5	91·3	93·2	95·0	97·2	99·3	101·5	103·7	106·1	108·3	110·5	112·8	114·9	117·0	119·1
	Ven.	323·8	335·8	347·7	359·9	12·0	24·3	36·4	48·6	60·8	72·8	85·2	97·3	109·6	127·8	134·1	146·5	158·9	171·3
	Sat .	206·2	205·4	204·6	203·9	203·2	202·5	201·7	201·3	200·9	200·5	200·6	200·7	200·9	201·5	202·1	202·6	203·5	204·5
1956	Mars ...	274·6	280·6	286·9	293·0	298·7	304·4	309·5	314·4	318·7	322·4	325·3	326·4	327·3	325·8	323·4	321·0	318·6	317·5
	Merc .	6·6	23·8	38·1	46·2	44·8	37·5	37·7	46·9	61·6	78·9	97·3	115·7	133·6	149·5	161·7	166·7	162·2	155·6
	Jup ...	116·8	116·8	117·1	117·7	118·6	119·7	121·0	122·8	124·5	126·4	128·5	130·5	132·7	134·8	137·1	139·3	141·5	143·7
	Ven ..	45·6	55·1	63·7	70·4	75·4	76·8	74·6	68·7	62·5	59·2	60·2	64·3	71·0	79·2	88·3	98·5	108·9	119·9
	Sat.	218·0	217·3	216·6	215·9	215·1	214·3	213·6	213·0	212·4	211·9	211·8	211·7	211·7	212·1	212·5	213·0	213·9	214·8
1957	Mars	53·4	59·7	65·8	72·2	78·3	84·8	91·1	97·2	103·7	109·8	116·3	122·6	128·7	135·9	141·7	148·1	154·5	160·8
	Merc .	16·5	26·2	26·7	19·8	17·2	25·0	39·0	56·4	74·8	93·5	111·7	128·4	142·2	149·2	147·5	139·9	135·5	147·8
	Jup ..	149·6	148·6	147·9	147·5	147·3	147·6	148·2	169·1	150·1	151·4	153·1	154·8	156·5	158·1	160·7	162·7	165·0	167·2
	Ven ...	359·7	12·1	24·4	36·7	49·1	61·3	74·5	85·7	97·8	109·9	122·0	134·0	146·1	158·1	170·1	182·9	193·8	205·3
	Sat	228·6	229·0	228·4	227·8	227·0	226·2	225·5	224·8	224·1	223·5	223·2	222·9	222·7	222·9	223·1	223·4	224·1	224·8
1958	Mars	295·2	302·6	309·9	317·2	324·3	331·5	328·6	345·1	352·3	358·7	5·0	10·9	16·4	21·7	26·1	30·0	33·1	34·8
	Merc ...	8·5	2·3	357·8	4·0	16·7	33·6	51·9	70·9	89·7	106·8	121·6	131·1	131·2	124·3	121·5	128·8	111·5	157·8
	Jup	183·5	182·2	180·9	179·8	178·8	178·1	177·6	177·4	177·6	178·2	179·1	180·1	181·5	183·0	184·7	186·4	188·5	190·6
	Ven ..	313·2	323·6	334·3	345·5	356·7	8·4	19·9	31·6	43·4	55·3	67·3	79·3	91·4	103·4	115·6	127·9	140·2	152·6
	Sat. .	241·0	240·6	240·2	239·7	239·0	238·3	237·5	236·8	236·1	235·3	234·8	234·3	233·9	233·9	234·0	234·0	234·6	235·2
1959	Mars .	68·5	71·1	79·9	85·8	91·7	97·7	103·8	109·9	116·0	122·0	128·3	134·6	141·0	147·2	153·7	160·2	166·5	173·2
	Merc ...	339·3	343·3	355·1	11·1	29·2	48·1	67·1	86·0	100·4	111·4	114·2	107·7	103·7	108·8	120·8	137·0	154·7	172·0
	Jup.	217·5	216·6	215·4	214·1	212·8	211·6	210·3	209·2	208·6	208·0	207·9	208·1	208·6	209·3	210·5	211·8	213·4	215·0
	Ven. .	35·6	47·3	59·0	70·4	81·8	92·5	103·1	113·1	122·6	130·7	137·7	142·4	142·5	141·6	135·6	129·8	126·7	127·0
	Sat. ...	251·9	251·7	251·5	251·2	250·6	250·0	249·3	248·6	247·9	247·1	246·4	245·7	245·1	245·0	244·9	244·8	245·2	245·6
1960	Mars ...	313·8	321·4	329·3	336·9	344·4	352·1	359·4	6·8	14·0	21·1	27·8	34·7	41·2	47·4	53·6	59·3	64·7	69·7
	Merc.	333·3	318·7	6·2	25·2	44·2	62·5	78·7	91·1	96·1	91·2	85·3	89·1	100·2	115·5	132·8	150·8	168·5	184·9
	Jup ...	250·0	250·2	249·8	249·2	248·3	247·2	245·9	244·6	243·2	242·0	240·7	240·2	239·6	239·4	239·6	240·1	240·9	242·1
	Ven ..	311·2	353·6	5·8	18·2	30·6	42·8	55·1	67·5	79·6	91·9	104·1	116·4	128·6	140·8	153·1	165·4	177·7	189·9
	Sat. .	263·1	263·0	262·9	262·8	262·3	261·8	261·2	260·4	259·6	258·9	258·2	257·5	256·8	256·5	256·2	255·8	256·0	256·2
1961	Mars	85·0	90·3	95·1	100·4	105·7	111·3	117·1	122·8	128·8	134·8	140·8	147·2	153·2	159·7	166·1	172·7	179·2	185·9
	Merc.	343·9	2·3	21·3	39·7	56·7	70·3	77·0	74·3	67·3	68·5	78·7	93·8	111·1	129·4	147·3	164·5	179·3	189·7
	Jup ..	280·8	281·9	282·8	283·4	283·5	283·3	282·8	282·1	281·0	279·7	278·5	277·1	275·8	274·7	273·8	273·1	272·8	272·9
	Ven. ...	357·1	351·6	349·8	351·7	356·8	3·6	12·1	21·5	31·7	42·0	53·0	64·1	75·7	87·3	99·0	110·9	122·4	134·8
	Sat. ...	273·8	274·0	274·2	274·4	274·0	273·6	273·8	272·5	271·7	271·0	270·3	269·6	268·8	268·3	267·8	267·2	267·2	267·2
1962	Mars	331·1	339·0	346·8	354·5	2·0	9·6	16·9	24·3	31·6	38·6	45·6	52·5	59·0	65·7	71·9	78·2	84·2	90·0
	Merc ..	358·5	16·9	31·2	48·7	57·2	56·6	49·3	48·1	57·6	72·0	89·1	107·4	125·8	143·5	159·2	171·5	176·3	171·8
	Jup. ..	309·6	311·6	313·4	314·9	316·3	317·2	318·1	318·4	318·6	318·3	317·7	316·7	315·7	314·4	313·0	311·5	310·3	309·2
	Ven	18·7	31·0	43·1	55·3	67·3	79·3	91·1	103·1	114·6	126·1	137·6	148·9	159·8	170·5	180·7	190·3	199·0	205·8
	Sat. ...	284·7	285·0	285·3	285·7	285·5	285·3	285·2	284·5	284·0	283·4	282·8	281·8	281·1	280·4	279·7	279·1	278·9	278·7

Mesh	Vrsh.	Mith.	Kat.	Sim.	Kan.	Tul.	Vrsch.	Dhan.	Mak.	Kum.	Min	Asvn.	Bhar.	Krit	Rohi.	Mrig.	Ardh.	Punar.	Pnsh.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

V-B—cont.

Mars, A.D. 1637—A.D. 1999, Mercury, A.D. 1645—A.D. 1999; Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 8	Mr 18	Mr 28	Ap 7
130·5	136·7	142·5	148·5	154·3	160·0	165·4	170·8	176·1	**1952**	181·3	186·0	190·6	194·6	198·2	201·0	203·4	204·4	204·7	203·4
168·9	185·0	204·1	220·6	234·7	244·5	245·6	238·6	234·4		240·1	252·1	267·7	285·1	303·0	320·9	337·1	350·6	357·8	358·4
343·1	341·8	340·7	339·8	339·3	339·1	339·2	339·8	340·6		341·7	343·2	344·8	346·6	348·6	350·7	352·4	355·3	357·7	0·0
132·7	139·6	147·8	157·1	167·0	177·6	188·6	200·1	211·8		223·5	235·6	247·7	260·1	272·2	284·7	297·0	309·2	321·6	334·0
164·4	165·6	166·8	167·9	168·9	169·9	170·9	171·4	171·9		172·5	172·5	172·6	172·6	172·1	171·6	171·1	170·4	169·7	168·9
																Mr 9	Mr 19	Mr 29	Ap 8
246·7	253·7	260·9	268·2	275·7	283·0	290·6	298·2	305·8	**1953**	313·4	321·0	328·4	336·2	343·6	351·0	358·4	5·7	13·1	20·8
183·7	200·2	215·5	226·8	230·5	225·1	218·9	222·0	232·4		247·0	264·2	281·7	299·4	316·0	330·1	338·8	338·1	330·6	329·5
24·3	23·1	21·7	20·4	19·0	17·9	16·8	16·0	15·6		15·5	15·9	16·5	17·4	18·6	20·1	21·9	23·7	25·7	27·8
201·6	214·0	226·2	238·3	250·5	262·6	274·6	286·4	298·2		309·6	320·6	331·2	341·4	350·6	358·5	4·8	8·3	8·3	4·2
175·1	176·3	177·5	178·8	179·8	180·8	181·9	182·6	183·3		184·1	184·3	184·5	184·7	184·4	184·1	183·8	183·1	182·4	181·8
143·2	149·3	155·5	161·6	167·6	173·7	179·8	185·8	191·8	**1954**	197·7	203·6	209·2	214·9	220·4	225·7	231·0	235·8	240·4	244·5
195·6	208·5	214·7	212·1	204·6	204·4	213·0	227·0	243·4		260·7	278·6	295·2	309·6	314·7	321·3	314·5	310·7	316·7	329·9
61·6	61·7	61·2	60·3	59·1	58·0	56·6	55·2	54·0		52·8	51·0	51·3	51·0	51·0	51·4	52·2	53·1	54·4	56·0
146·4	158·7	171·1	183·5	195·8	208·3	220·9	233·4	246·1		258·6	271·5	284·0	296·6	309·3	321·8	334·4	346·7	359·2	11·6
185·5	186·7	187·9	189·1	190·2	194·3	192·4	193·2	194·0		194·9	195·4	195·9	196·3	196·2	196·1	196·0	195·4	194·8	194·3
271·5	277·7	284·0	290·7	297·5	304·3	311·2	318·[illegible]	325·1	**1955**	332·3	339·5	346·6	353·6	0·7	7·6	14·4	21·3	28·2	35·1
198·2	197·9	180·4	187·6	194·7	207·2	223·0	240·3	257·7		274·6	289·7	300·6	301·5	298·6	293·1	297·3	308·5	324·6	342·2
93·5	94·4	95·1	95·4	95·4	95·0	94·3	93·4	92·2		91·0	89·7	88·4	87·1	86·0	85·3	84·8	84·6	84·9	85·4
212·7	215·8	215·4	210·4	204·5	200·6	200·0	204·0	209·9		218·1	227·2	237·3	247·8	259·0	270·3	281·8	293·8	305·5	317·5
195·6	196·8	198·0	199·1	200·3	201·5	202·6	203·6	204·6		205·5	206·1	206·7	207·3	207·4	207·6	207·7	207·3	206·9	206·4
																Mr 8	Mr 18	Mr 28	Ap 7
155·2	161·7	168·1	174·3	180·8	187·1	193·5	199·9	206·3	**1956**	212·8	219·3	225·8	232·3	238·7	245·2	251·6	258·1	264·6	270·9
176·5	171·5	176·2	187·6	202·7	219·7	237·0	254·1	269·6		282·1	287·7	283·9	277·2	278·4	288·0	302·7	320·2	338·5	357·0
120·8	122·4	123·9	125·2	126·2	126·8	127·3	127·4	127·1		126·6	125·7	124·6	123·3	122·0	120·6	119·3	118·4	117·6	116·9
183·8	196·1	208·7	221·2	233·6	246·2	258·5	271·2	283·6		296·0	308·4	320·5	332·6	344·6	356·4	7·8	19·1	30·1	40·7
205·5	206·7	207·9	209·0	210·2	211·4	212·5	213·6	214·7		215·7	216·4	217·1	217·9	218·2	218·5	218·6	218·7	218·5	218·3
																Mr 9	Mr 19	Mr 29	Ap 8
317·5	318·7	321·4	324·6	328·7	333·2	338·0	343·5	348·8	**1957**	354·7	0·5	6·6	12·6	18·7	24·9	31·1	37·3	43·7	50·0
157·6	168·0	182·5	199·2	216·6	233·7	249·8	262·9	270·8		269·3	261·7	260·3	268·3	281·8	298·5	316·6	334·9	352·9	8·8
145·8	147·8	149·8	151·6	153·2	154·6	155·9	156·9	157·5		158·1	158·0	157·8	157·3	156·4	155·2	154·0	152·8	151·4	150·1
131·2	143·0	154·6	166·4	178·6	190·7	203·0	215·3	227·9		240·1	252·9	265·5	277·9	290·1	303·2	315·6	328·2	340·5	352·9
215·6	216·7	217·8	218·9	220·2	221·5	222·8	223·9	225·0		226·0	226·8	227·6	228·5	228·9	229·5	229·7	229·6	229·5	229·6
167·4	173·9	180·4	187·1	193·6	200·1	207·0	213·9	226·6	**1958**	227·5	234·1	241·4	248·4	255·5	262·5	269·7	276·9	284·3	291·6
162·2	178·5	196·1	213·1	229·8	244·1	253·6	254·6	247·7		243·7	248·8	261·5	277·3	294·9	313·1	330·9	347·5	0·9	8·6
169·3	171·5	173·7	175·7	177·8	179·8	181·6	183·2	184·7		186·0	186·9	187·6	188·1	188·1	187·9	187·4	186·5	185·1	184·2
216·9	228·3	239·4	250·1	260·3	270·0	278·7	285·9	290·7		292·2	290·1	284·6	278·9	276·7	278·1	282·9	290·1	298·4	308·0
225·5	226·5	227·5	228·6	229·8	231·0	232·1	233·2	234·4		235·5	236·5	237·5	238·5	239·1	239·7	240·1	240·6	240·8	240·9
35·5	34·8	32·8	30·2	27·3	25·2	23·3	22·8	24·0	**1959**	25·8	28·4	31·6	35·5	39·9	44·5	49·5	54·6	60·0	65·5
175·0	192·7	209·6	224·5	235·9	239·1	234·6	228·2	231·1		241·3	256·5	273·4	291·4	309·2	326·2	340·0	349·0	349·0	341·6
192·7	195·0	197·1	199·2	201·5	203·7	205·8	207·9	209·9		211·7	213·3	214·9	216·2	217·2	218·0	218·5	218·5	218·4	217·9
165·0	177·5	189·9	202·4	215·0	227·6	240·1	252·9	265·6		278·1	290·7	303·3	315·9	328·3	340·6	352·8	5·1	17·1	29·4
235·7	236·6	237·5	238·4	239·5	240·6	241·8	243·2	244·2		245·3	246·4	247·5	248·5	249·3	250·1	250·9	251·3	251·7	252·1
																Mr 8	Mr 18	Mr 28	Ap 7
179·8	186·5	193·1	199·9	206·9	213·7	220·7	227·7	234·9	**1960**	242·1	249·5	256·8	264·3	271·7	279·2	286·9	294·5	302·2	309·9
189·6	205·1	218·2	225·4	220·6	211·8	213·6	222·3	236·5		252·7	270·3	288·1	305·0	319·9	329·9	331·6	324·7	321·0	327·5
217·0	218·9	221·1	223·3	225·4	227·6	230·0	232·2	234·3		236·5	238·7	240·7	242·6	244·5	246·0	247·3	248·5	249·4	250·0
132·4	138·9	147·5	156·9	167·0	177·8	189·0	200·5	212·2		223·9	236·0	248·1	260·6	272·8	285·3	297·5	309·8	322·2	334·6
246·0	246·8	247·6	248·3	249·4	250·5	251·6	252·8	254·0		255·1	256·2	257·3	258·4	259·4	260·3	261·3	261·8	262·3	262·9
																Mr 9	Mr 19	Mr 29	Ap 8
74·1	78·3	81·6	84·1	85·5	86·1	85·2	82·7	79·4	**1961**	75·8	72·4	69·8	68·6	68·8	70·2	72·3	75·4	79·0	83·0
198·8	207·2	206·8	199·3	196·8	208·8	216·5	232·3	249·4		266·9	283·8	299·1	310·5	311·3	308·6	303·0	307·3	318·7	334·5
243·4	244·9	246·7	248·7	250·6	252·7	255·0	257·2	259·5		261·9	264·1	266·4	268·7	271·0	273·0	275·0	276·9	278·6	280·1
202·2	214·4	226·6	239·0	251·1	263·1	275·0	286·9	298·4		308·8	320·9	331·2	341·2	350·2	357·8	3·4	6·1	5·3	0·4
256·3	257·0	257·7	258·4	259·4	260·4	261·4	262·6	263·8		264·9	266·1	267·3	268·4	269·4	270·4	271·5	272·2	272·9	273·6
192·8	199·7	206·6	213·5	220·5	227·6	234·9	242·3	249·7	**1962**	257·2	246·8	272·4	280·1	287·9	295·6	303·4	311·4	319·4	327·1
192·2	185·8	180·7	185·3	196·8	211·9	228·3	246·2	263·4		279·0	291·5	297·2	293·8	286·7	287·8	298·0	312·7	330·2	348·6
273·2	273·9	275·0	276·3	277·7	279·6	281·4	283·4	285·5		289·8	290·2	292·4	294·8	297·2	299·6	302·0	304·3	306·5	308·6
147·0	156·3	171·8	184·1	196·5	208·9	221·5	234·2	246·9		259·5	272·1	284·7	297·3	310·0	322·4	335·0	347·5	359·8	12·2
267·2	267·7	268·2	268·8	269·7	270·6	271·5	272·6	273·7		274·9	276·1	277·3	278·4	279·5	280·6	281·7	282·6	283·5	284·3
95·6	100·9	105·7	110·3	114·2	117·6	120·2	121·8	122·6	**1963**	122·3	120·4	117·6	113·8	109·8	106·6	104·0	103·3	103·6	105·5
165·1	167·2	177·1	191·7	208·3	225·7	242·9	259·0	272·8		280·0	278·0	271·6	269·7	278·1	291·5	308·3	326·5	344·0	3·1
308·4	308·0	307·8	308·0	308·6	309·5	310·6	312·0	313·7		315·5	317·5	319·7	322·0	324·3	326·7	329·0	331·4	333·8	336·3
210·8	212·8	212·0	206·7	201·0	197·6	198·6	202·6	209·3		217·7	227·3	237·3	248·0	259·3	270·8	282·2	294·1	305·9	317·9
278·4	278·7	279·0	279·4	280·2	281·9	281·7	282·8	283·9		284·9	286·1	287·3	288·6	289·8	291·0	292·1	293·1	294·1	295·0

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesu.	Mula	P. Ash.	U. Ash.	Śrav.	Dan.	Satab.	P Bhad.	U. Bhad.	Revat
133·8	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·8	266·7	280·0	293·3	306·7	320·0	333·3	346·7	60.00

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle.
Venus A.D. 1765—A.D. 1999;

	Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ...	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1963	Mars .	106.6	109.3	113.0	117.1	121.7	126.5	131.6	137.2	142.7	148.6	154.5	160.4	166.8	173.0	179.7	186.0	192.7	199.7
	Merc	11.9	27.3	37.3	37.9	30.7	28.4	36.2	49.9	66.7	84.8	103.5	121.8	138.7	152.1	158.3	157.3	149.5	119.4
	Jup. ...	337.5	339.8	342.1	344.3	346.4	348.3	350.0	354.5	352.8	353.8	354.5	354.7	354.9	354.5	353.7	352.8	351.6	350.2
	Ven	324.1	336.2	348.2	0.4	12.6	24.8	37.0	49.1	61.3	73.3	85.7	97.7	110.1	122.4	134.8	147.0	159.4	171.9
	Sat. .	295.5	296.1	296.7	297.2	297.3	297.4	297.4	296.9	296.4	296.0	295.2	294.4	293.6	292.9	292.2	291.5	291.1	290.7
1964	Mars ..	347.5	355.2	2.9	10.9	18.0	25.3	32.6	39.9	46.9	53.8	60.8	67.4	74.2	80.6	87.2	93.4	99.5	105.7
	Merc. ..	16.3	19.5	18.1	8.6	14.6	27.5	44.1	62.4	81.4	100.8	117.0	131.6	141.0	141.5	134.6	131.3	138.6	151.5
	Jup. .	5.4	7.8	10.2	12.5	14.9	17.3	19.5	21.6	23.6	25.5	27.1	28.6	29.7	30.5	31.1	31.2	31.0	30.5
	Ven. .	45.8	55.1	63.3	69.5	73.7	74.3	70.7	65.0	59.3	57.1	58.7	63.3	70.3	78.0	88.4	98.7	109.4	120.4
	Sat. .	306.5	307.2	307.9	308.7	309.0	309.3	309.5	309.2	308.9	308.6	308.0	307.4	306.7	306.0	305.1	304.2	303.7	303.2
1965	Mars .	135.4	135.5	136.4	138.6	141.4	145.1	149.3	153.9	159.0	164.2	170.0	175.8	181.8	188.1	194.5	201.1	207.8	214.5
	Merc.	356.1	349.9	353.3	5.5	21.2	39.4	58.5	77.2	95.0	110.5	121.9	124.7	118.6	113.7	118.5	130.8	146.3	163.5
	Jup. ...	32.7	35.0	37.3	39.6	42.1	44.4	46.8	49.2	51.5	53.7	55.8	51.9	59.8	61.5	63.1	64.8	65.3	66.1
	Ven.	0.2	12.6	24.9	37.4	49.6	61.8	74.1	86.2	98.4	110.4	122.6	134.5	146.6	158.5	170.5	182.4	194.2	205.8
	Sat.	317.5	318.4	319.3	320.3	320.8	321.3	321.8	321.7	321.6	321.6	321.1	320.6	320.0	319.2	318.4	317.6	316.9	316.2
1966	Mars ..	3.1	10.9	18.1	25.5	32.6	39.8	47.0	54.0	60.9	67.8	74.4	81.2	87.6	94.3	100.6	107.0	113.2	119.6
	Merc. ...	333.8	343.4	358.8	16.6	35.5	54.4	72.9	89.3	101.9	106.8	101.9	96.1	99.5	110.2	125.2	142.5	160.2	177.9
	Jup. ..	60.8	62.4	64.3	66.4	68.5	70.6	73.0	75.2	77.6	79.9	82.2	84.5	86.6	88.9	90.9	92.8	94.6	96.0
	Ven .	313.4	323.6	334.8	345.8	357.2	8.8	20.5	32.2	44.0	55.9	67.8	80.0	91.9	104.1	116.2	128.6	140.8	153.2
	Sat ...	328.6	329.7	330.8	331.8	332.5	333.2	333.9	334.1	334.3	334.5	334.2	333.9	333.5	332.8	333.1	331.3	330.5	329.7
1967	Mars	180.6	177.1	176.1	171.7	171.2	172.1	174.1	177.1	180.5	184.8	189.6	194.7	200.5	206.3	212.3	218.7	225.2	232.1
	Merc	337.1	354.2	12.7	31.5	50.1	67.0	80.6	87.9	85.1	78.0	79.2	89.2	102.9	120.9	139.1	156.9	178.1	188.9
	Jup. ...	90.0	90.8	92.0	93.3	94.9	96.8	98.6	100.6	102.7	105.0	107.1	109.4	111.7	113.9	116.1	118.3	120.4	122.4
	Ven.	36.1	47.8	59.4	70.9	82.0	93.0	103.2	113.2	122.2	130.2	136.5	140.7	140.1	138.0	131.8	126.0	124.7	125.8
	Sat. ...	339.8	341.0	342.2	343.4	344.3	345.2	346.2	346.7	347.2	347.6	347.5	347.4	347.3	346.7	346.1	345.5	344.7	343.9
1968	Mars ...	18.2	25.4	32.5	39.5	46.6	53.6	60.3	67.1	74.0	80.7	87.6	93.7	100.4	106.6	113.7	119.5	125.6	132.1
	Merc. ...	349.9	8.8	27.2	44.5	59.2	68.1	67.7	60.2	59.2	67.7	82.1	99.1	117.2	135.5	152.8	168.6	180.7	185.6
	Jup. ..	121.2	121.0	121.1	121.6	122.3	123.5	124.7	126.2	127.9	129.7	131.7	133.7	135.9	138.1	140.3	142.6	144.8	146.9
	Ven. ...	341.7	354.2	6.3	18.7	31.2	43.3	55.7	68.0	80.2	92.4	104.8	116.9	129.1	141.3	153.6	166.0	178.2	190.5
	Sat.	351.6	352.9	354.2	355.4	356.5	357.6	358.6	359.3	0.0	0.7	0.9	1.1	1.2	0.8	0.4	0.0	359.2	358.4
1969	Mars ...	232.0	233.1	233.3	232.3	230.0	227.5	224.4	222.3	220.9	220.9	222.2	224.7	228.1	232.3	237.0	242.5	248.3	254.2
	Merc.	4.8	22.3	37.6	47.7	49.4	42.4	39.3	46.1	60.3	76.9	95.1	113.7	131.7	148.1	161.8	168.6	167.0	159.4
	Jup	154.2	153.2	152.3	151.7	151.6	151.6	152.0	152.7	153.7	155.0	156.4	158.1	159.9	161.9	163.9	166.0	168.1	170.2
	Ven ..	353.1	348.4	346.8	350.3	356.0	3.2	12.1	21.5	31.7	42.5	53.4	64.5	76.1	87.7	99.5	111.3	123.5	135.5
	Sat. ...	3.4	4.7	6.0	7.3	8.5	9.7	10.9	11.8	12.7	13.7	14.1	14.5	15.0	14.9	14.8	14.6	14.0	13.4
1970	Mars	32.7	39.8	46.6	53.4	60.0	66.8	73.5	79.9	86.4	92.9	99.4	105.9	112.3	119.0	125.2	131.5	137.8	144.1
	Merc.	15.3	27.1	30.4	23.7	19.8	25.3	37.9	54.3	72.5	91.3	109.7	127.0	141.7	150.5	151.5	143.4	141.1	148.1
	Jup. ...	188.3	186.9	185.5	184.5	183.3	182.4	181.8	181.7	181.6	182.1	182.8	183.7	184.9	186.4	188.1	189.9	191.8	193.9
	Ven .	19.3	31.6	43.7	55.9	67.9	80.1	91.9	103.6	115.3	126.8	138.2	149.2	160.1	170.6	180.5	190.0	198.3	204.9
	Sat. .	15.4	15.7	18.0	19.4	19.7	22.0	23.3	24.4	25.5	26.6	27.3	28.1	28.7	28.9	29.1	29.2	28.8	28.4
1971	Mars	264.7	270.3	275.6	280.5	285.2	289.3	293.0	296.0	297.4	298.0	298.0	294.7	291.7	289.8	287.8	288.0	289.1	291.3
	Merc.	11.5	6.9	0.8	4.4	16.1	31.7	49.9	68.6	87.8	104.3	120.8	132.3	134.8	128.4	123.7	128.7	140.5	155.8
	Jup ..	222.1	221.2	220.2	218.9	217.7	216.3	215.1	213.9	213.0	212.5	212.2	212.2	212.6	213.3	214.2	215.4	216.9	218.6
	Ven. .	324.8	336.8	348.9	1.0	13.2	25.4	37.6	49.8	61.7	74.0	86.3	98.4	110.7	123.0	135.4	147.7	160.0	172.5
	Sat ..	27.8	29.1	30.4	31.6	33.0	34.4	35.8	37.0	38.2	39.5	40.4	41.3	42.2	42.6	43.0	43.5	43.4	43.3
1972	Mars ..	47.6	53.9	60.5	66.9	73.3	79.7	86.0	92.6	98.8	105.2	111.6	117.8	124.2	130.7	137.0	143.3	149.8	156.3
	Merc. .	342.9	343.8	354.2	9.2	27.0	45.9	64.9	83.1	99.4	112.1	117.3	112.7	106.3	109.0	120.1	135.0	152.1	169.8
	Jup. ..	254.5	254.7	254.6	254.1	253.3	252.3	251.1	249.7	248.3	247.1	245.9	245.0	244.4	244.0	244.0	244.4	245.1	246.0
	Ven.	45.7	54.8	62.5	68.6	71.8	71.8	67.7	61.1	56.1	54.8	57.3	62.9	70.0	79.0	88.6	98.9	109.6	120.7
	Sat.	40.4	41.7	43.0	44.3	45.6	46.9	48.3	49.6	50.9	52.2	53.3	54.4	55.5	56.2	56.9	57.6	57.7	57.8
1973	Mars ..	287.6	294.7	301.4	308.5	315.3	322.0	328.6	335.2	341.3	347.4	352.9	357.8	2.2	6.1	8.8	10.4	10.5	9.2
	Merc.	322.9	346.9	4.2	22.9	41.8	60.5	77.5	91.3	98.5	96.3	89.0	89.4	99.4	113.8	130.8	148.5	166.3	183.4
	Jup. ..	284.8	286.1	287.1	287.8	288.1	288.2	287.9	287.2	286.4	285.2	283.8	282.5	281.1	279.1	278.8	278.1	277.6	277.4
	Ven. .	0.8	18.2	25.6	38.0	50.3	62.4	74.8	86.8	99.0	111.0	123.2	135.2	147.2	159.1	171.0	182.9	194.6	206.2
	Sat .	53.3	54.5	55.7	56.8	58.1	59.4	60.8	62.1	63.5	64.9	66.1	67.3	68.5	69.4	70.3	71.3	71.9	72.7
1974	Mars ..	62.3	68.5	74.3	80.4	86.5	92.5	98.7	104.9	111.1	117.4	123.4	129.8	136.1	142.5	148.9	155.2	161.9	168.4
	Merc	341.9	0.0	18.9	37.6	55.2	69.9	78.5	78.5	71.2	69.8	79.4	92.4	109.0	126.0	145.8	162.5	178.3	190.2
	Jup ..	313.6	315.6	317.4	319.0	320.5	321.7	322.6	323.2	323.5	323.3	322.9	322.2	321.1	319.8	318.6	317.2	315.9	314.7
	Ven ...	313.4	323.8	335.0	346.2	357.8	9.2	20.9	32.7	44.6	56.6	68.4	80.5	92.6	104.8	117.0	129.3	141.6	153.9
	Sat	66.5	67.5	68.5	69.5	70.8	72.1	73.3	74.7	76.0	77.3	78.6	79.9	81.2	82.2	83.4	84.5	85.2	85.9

Mesh.	Vrsh	Mith	Kat.	Sim	Kan.	Tul	Vsch	Dhan.	Mak.	Kum.	Min	Asvn.	Bhar	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13.3	26.7	40.0	53.3	66.7	80.0	93.3	106.7	120.0

V-B—cont

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999, Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—cont.

Year	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360
	O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29	Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 8	Mr 18	Mr 28	Ap 7
1964	206·4	213·5	220·5	227·6	235·1	242·5	249·9	257·1	265·1	272·9	280·4	288·4	296·3	304·1	312·0	319·8	327·9	335·7	343·4
	151·8	171·7	187·8	205·2	222·6	238·9	253·2	263·0	268·6	256·5	252·8	258·8	271·0	286·7	304·3	322·8	340·7	357·6	11·6
	348·8	347·5	346·3	345·2	344·6	344·1	344·1	344·5	345·2	346·1	347·4	348·9	350·6	352·5	354·7	356·8	359·1	1·4	3·8
	184·3	196·8	209·2	221·7	234·1	246·7	259·3	271·7	284·2	296·5	308·7	320·8	332·9	344·9	356·7	8·2	19·4	30·3	40·7
	290·2	290·3	290·4	290·4	291·1	291·8	292·4	293·4	294·4	295·8	296·5	297·7	298·8	300·0	301·2	302·5	303·6	304·7	305·9
																Mr 9	Mr 19	Mr 29	Ap 8
1965	111·5	117·3	122·8	128·1	133·3	138·1	142·6	146·3	149·7	152·2	154·0	154·7	154·1	151·8	148·5	144·9	141·0	138·0	136·1
	167·4	184·5	202·1	218·8	233·9	244·8	248·6	243·1	236·9	240·2	251·0	267·2	283·1	301·2	319·0	336·0	359·3	359·6	359·8
	29·7	28·6	27·3	26·1	24·7	23·4	22·2	21·3	20·8	20·5	20·6	21·1	21·8	22·9	24·3	25·8	27·7	29·6	31·7
	131·8	143·4	155·1	167·1	179·1	191·3	205·6	215·9	228·5	246·0	253·5	266·2	278·5	291·0	303·8	316·2	328·8	341·3	353·8
	302·8	302·6	302·4	302·2	302·6	303·0	303·5	304·4	305·3	306·1	307·2	308·3	309·5	310·8	312·1	313·3	314·6	315·8	316·9
1966	221·6	228·7	235·9	243·2	250·7	258·2	265·8	273·7	281·3	289·1	296·9	304·8	312·7	320·4	328·3	336·2	343·8	351·6	35[illegible]
	181·2	198·5	214·2	226·7	232·8	230·8	222·8	222·4	231·7	245·6	262·1	280·0	297·5	314·5	329·4	339·8	341·9	335·4	331
	66·4	66·4	66·0	65·5	64·5	63·3	62·1	60·7	59·3	58·2	57·1	56·3	55·8	55·7	55·9	56·5	57·4	58·5	5[illegible]
	217·3	228·6	239·6	250·1	260·2	269·7	278·0	284·8	288·8	289·4	288·2	280·5	275·0	275·2	276·4	281·8	289·4	299·2	307·9
	315·4	315·1	314·8	314·4	314·6	314·8	315·1	315·8	316·5	317·2	318·3	319·4	320·4	321·6	322·8	324·1	325·4	326·7	328·0
1967	125·5	131·5	137·2	143·0	148·7	154·4	159·7	164·6	169·5	174·1	178·2	182·0	185·0	187·4	189·0	189·1	188·0	185·1	182·0
	194·4	208·1	216·5	215·7	208·3	205·0	212·9	225·7	241·5	258·7	276·3	293·4	308·9	320·4	324·5	319·1	318·5	316·7	328·6
	97·3	98·4	99·3	99·7	99·9	99·8	99·2	98·4	97·4	96·1	94·7	93·4	92·1	91·0	90·1	89·5	89·2	89·2	89·7
	165·6	178·1	190·7	203·0	215·7	228·2	240·8	253·5	266·2	278·8	291·4	303·9	316·5	328·8	341·1	353·5	5·7	17·7	30·0
	328·9	328·4	327·9	327·3	327·3	327·2	329·2	327·7	328·2	328·8	329·8	330·8	331·7	332·9	334·1	335·3	336·6	337·9	339·2
																Mr 8	Mr 18	Mr 28	Ap 7
1968	239·1	246·2	253·3	260·6	268·1	275·8	283·2	290·9	298·7	306·3	314·1	321·8	329·5	336·9	344·8	352·2	359·7	7·0	14·4
	199·0	201·2	194·6	189·9	194·5	206·0	220·8	238·0	255·4	272·7	288·4	301·1	307·0	303·3	296·2	297·8	308·0	322·8	340·2
	124·3	126·1	127·6	128·9	130·1	130·9	131·5	131·8	131·5	131·1	130·3	129·4	128·1	126·9	125·6	124·3	123·1	122·2	121·4
	131·4	138·5	147·3	156·9	167·2	178·3	189·4	201·0	212·6	224·5	236·4	248·7	261·0	273·3	285·8	298·0	310·4	322·8	335·3
	343·1	342·3	341·6	340·9	340·6	340·3	340·1	340·4	340·7	341·0	341·8	342·6	343·4	344·5	345·6	346·8	348·1	349·4	350·7
																Mr 9	Mr 19	Mr 29	Ap 8
1969	138·1	144·3	150·4	156·5	162·5	168·3	174·4	180·1	185·9	191·6	197·0	202·3	207·5	212·4	217·0	221·3	225·3	228·4	230·9
	181·1	174·3	176·3	186·6	200·9	217·6	234·8	252·0	268·3	281·6	289·5	288·3	280·8	279·3	287·4	301·3	318·1	336·4	354·8
	149·1	151·1	153·1	154·9	156·7	158·2	159·5	160·6	161·5	162·0	162·3	162·1	161·6	160·8	159·9	158·7	157·4	156·2	154·8
	202·7	215·0	227·1	239·3	251·4	263·4	275·4	287·2	298·8	309·9	320·9	331·1	340·9	349·7	356·9	2·0	3·9	2·1	356·3
	357·7	356·9	356·0	355·2	354·7	354·2	353·8	353·8	353·9	353·9	354·5	355·1	355·8	356·8	357·8	358·9	0·1	1·3	2·6
1970	260·8	267·3	274·1	281·1	288·2	295·5	302·8	310·8	317·4	324·8	332·2	339·4	346·8	354·0	1·7	8·3	15·2	22·5	29·1
	158·5	166·6	181·0	197·1	214·4	231·7	248·1	262·5	272·0	273·1	266·2	262·2	267·5	280·7	296·5	314·5	332·8	350·9	7·8
	172·5	174·7	176·8	179·0	181·[illegible]	183·0	184·9	186·7	188·2	189·5	190·6	191·5	192·0	192·2	192·[illegible]	191·7	191·1	190·0	188·8
	147·7	159·9	172·4	184·7	197·1	209·5	222·1	234·9	247·5	260·2	272·7	285·4	298·0	310·6	323·0	335·6	348·0	360·4	12·8
	12·7	11·9	11·1	10·2	9·5	8·8	8·1	7·9	7·7	7·4	7·8	8·2	8·5	9·4	10·3	11·1	12·3	13·5	14·7
1971	150·5	156·8	162·9	169·5	175·5	181·9	188·1	194·4	200·6	206·8	213·1	219·4	225·5	231·7	237·9	244·1	249·9	255·9	261·7
	160·8	176·6	198·6	211·2	227·8	242·8	254·2	257·6	251·8	246·2	249·8	260·4	275·4	292·6	310·6	328·8	315·7	0·5	10·0
	196·0	198·1	200·4	202·6	204·7	207·0	209·1	211·2	213·1	215·1	216·9	218·5	219·9	221·0	221·9	222·5	222·8	222·9	222·3
	209·7	210·5	208·3	202·6	197·3	194·6	196·8	201·6	208·7	217·3	227·3	237·4	248·3	259·4	271·1	282·6	294·6	306·4	318·6
	27·9	27·1	26·3	25·6	24·8	24·0	23·1	22·6	22·1	21·6	21·7	21·8	21·9	22·6	23·3	23·9	25·0	26·1	27·1
																Mr 8	Mr 18	Mr 28	Ap 7
1972	294·9	292·2	303·9	308·9	314·4	320·4	326·5	332·7	338·9	345·3	351·8	358·3	4·8	11·3	18·0	24·4	31·2	37·4	43·9
	172·0	189·5	207·9	223·4	236·0	241·7	239·1	231·4	231·2	240·9	254·8	271·3	289·1	307·0	324·2	339·5	350·2	352·6	346·1
	220·3	222·3	224·5	226·5	228·8	231·0	233·2	235·5	237·8	240·0	242·1	244·3	246·2	248·0	249·8	251·2	252·4	253·4	254·2
	185·0	197·4	209·9	222·3	234·8	247·3	259·7	272·3	284·8	297·0	309·3	321·5	333·5	345·4	357·1	8·6	19·6	30·5	40·7
	43·1	42·5	41·9	41·2	40·3	39·4	38·6	37·9	37·2	36·5	36·3	36·1	35·9	36·3	36·7	37·0	37·9	38·8	39·8
																Mr 9	Mr 19	Mr 29	Ap 8
1973	162·7	169·2	175·6	181·9	188·7	195·2	201·8	208·3	215·0	221·7	228·4	235·3	242·1	248·9	255·9	262·8	269·8	276·7	283·9
	187·4	203·8	217·3	225·3	224·9	217·3	214·8	221·6	234·8	250·9	268·1	285·9	303·3	318·6	330·4	334·6	329·5	323·6	327·3
	247·2	248·7	250·3	252·1	254·2	256·3	258·4	260·8	263·0	265·3	267·6	270·0	272·2	274·4	276·6	278·7	280·6	282·6	284·1
	132·2	143·8	155·7	167·7	179·7	191·5	204·2	216·6	229·1	241·6	254·8	266·5	279·3	291·8	304·2	316·7	329·4	341·8	354·3
	57·9	57·5	57·1	56·6	55·8	55·0	54·2	53·4	52·6	51·8	51·4	51·0	50·5	50·6	50·7	50·8	51·5	52·2	52·9
1974	7·0	4·5	1·7	0·5	359·9	0·7	2·2	4·9	8·1	11·8	15·8	20·8	25·9	31·0	36·3	41·9	47·6	53·4	59·2
	198·0	208·2	210·3	204·0	198·8	203·0	215·1	230·3	247·3	264·7	282·1	297·9	310·6	316·8	313·8	306·8	307·4	318·0	332·8
	277·7	278·3	279·1	280·3	281·8	283·3	285·1	287·2	289·3	291·5	293·9	296·1	298·4	300·9	303·2	305·6	307·9	310·2	312·4
	217·6	228·9	239·8	250·3	260·1	269·4	277·3	283·2	286·5	286·5	282·5	276·1	272·1	271·5	274·9	281·0	289·0	298·1	307·9
	72·5	72·4	72·2	72·1	71·4	70·7	70·1	69·2	68·3	67·5	66·8	66·1	65·4	65·2	65·0	64·9	65·3	65·7	66·2
1975	174·8	181·5	188·3	195·0	201·7	208·5	215·3	222·2	229·2	236·4	243·6	250·7	258·1	265·4	272·6	280·3	287·6	295·3	302·8
	194·9	190·1	188·6	185·7	196·0	210·2	226·7	244·2	261·3	277·6	291·1	299·0	297·8	290·3	288·8	297·5	310·5	328·0	346·5
	318·7	313·0	312·9	312·8	313·1	313·9	314·9	316·2	317·7	319·5	321·4	323·6	325·8	328·[illegible]	330·3	332·8	335·2	337·6	340·0
	166·4	178·8	191·4	203·7	216·4	228·9	241·6	254·1	266·8	279·4	292·0	304·6	317·1	329·4	341·7	354·1	6·2	18·2	30·5
	86·6	86·7	86·8	86·8	86·4	86·0	85·5	84·7	83·9	83·1	82·3	81·5	80·7	80·3	79·9	79·4	79·5	79·6	79·7

Mag.	P. Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa	Anur.	Jyesh	Mula	P. Ash.	U. Ash.	Śrav.	Dan.	Satab	P. Bhad	U. Bhad	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle. Venus, A.D. 1765—A.D. 1999;

Day of I.S.Y.		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
	Eng. date ..	Ap 14	Ap 24	My 4	My 14	My 24	Je 3	Je 13	Je 23	Jl 3	Jl 13	Jl 23	Au 2	Au 12	Au 22	S 1	S 11	S 21	O 1
1975	Mars ...	306·8	314·4	322·0	329·4	337·0	344·5	351·8	359·1	6·0	13·1	19·7	26·4	32·8	38·7	44·5	49·7	54·6	59·0
	Merc. .	356·2	15·0	32·6	48·0	58·4	60·4	53·6	50·4	57·2	70·6	87·2	05·1	123·5	141·4	157·7	171·1	178·4	176·1
	Jup	341·6	343·9	346·2	348·5	350·6	352·5	354·3	356·0	357·3	358·4	359·3	359·7	359·9	359·7	359·1	358·2	357·0	355·8
	Ven.	36·6	48·2	59·7	71·1	82·2	93·0	103·2	112·9	121·7	129·6	134·9	138·0	137·4	132·5	126·2	121·8	121·2	124·4
	Sat ..	80·2	81·0	81·8	82·5	83·6	84·7	85·9	87·2	88·5	89·5	91·2	92·5	93·9	95·1	96·3	97·4	98·4	99·3
	Eng date .	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1976	Mars ...	78·6	83·7	89·1	94·7	100·3	105·9	111·8	117·8	123·6	129·9	136·0	142·0	148·5	154·7	161·1	167·7	174·2	180·8
	Merc. ..	10·3	26·2	37·8	41·6	35·9	30·9	35·8	48·7	64·8	82·8	101·4	119·8	136·8	15 . 3	160·7	161·2	153·7	150·7
	Jup. .	9·1	11·5	13·9	16·3	18·6	21·0	23·3	25·5	27·5	29·5	31·2	32·7	34·1	35·1	35·7	36·0	36·2	35·8
	Ven.	342·4	354·8	7·2	18·5	31·8	43·9	56·3	68·5	80·7	93·1	105·2	117·5	129·7	142·0	154·2	166·6	178·8	191·1
	Sat.	93·8	94·3	94·8	95·4	96·4	97·4	98·3	98·5	100·7	102·0	103·4	104·8	106·1	107·3	108·5	109·8	110·8	111·9
1977	Mars	324·6	332·4	340·2	347·5	355·3	2·8	10·4	17·7	24·9	31·9	38·8	45·7	52·5	59·0	65·2	71·3	77·3	82·8
	Merc .	16·7	22·7	18·2	11·9	14·5	26·4	42·1	60·1	78·9	97·5	115·2	130·8	142·1	144·9	139·1	133·5	137·9	149·9
	Jup. ..	36·6	38·7	41·1	43·3	45·7	48·1	50·5	52·8	55·1	57·4	59·6	61·6	63·7	65·5	67·0	68·5	69·6	70·4
	Ven ...	349·1	345·3	345·5	348·9	355·4	3·0	12·1	21·7	32·0	42·7	54·0	65·2	76·6	88·3	100·1	111·9	123·9	136·2
	Sat. ..	107·6	107·8	108·0	108·3	109·1	109·9	110·6	111·7	112·8	114·8	115·3	116·6	117·8	119·1	120·4	121·8	122·9	124·0
1978	Mars	97·8	101·2	105·5	110·3	115·1	120·3	125·8	131·2	137·2	143·0	148·9	155·2	161·4	167·7	174·1	180·6	187·5	194·1
	Merc	0·5	353·3	351·6	4·6	19·8	37·4	55·3	74·3	92·2	109·7	121·1	127·0	123·0	116·5	119·2	129·8	144·8	161·6
	Jup. ..	61·7	66·3	68·1	70·0	72·1	74·2	76·5	78·7	81·1	83·4	85·6	88·0	90·2	92·3	94·4	96·4	98·2	99·8
	Ven.	19·9	32·2	44·1	56·5	68·6	80·4	92·2	104·0	115·6	127·2	138·5	149·6	160·2	170·8	180·7	189·7	197·8	204·0
	Sat	121·5	121·4	121·3	121·3	121·9	122·5	123·0	123·9	124·8	125·8	127·0	128·2	129·5	130·8	132·1	133·3	134·5	135·7
	Eng date	Ap 14	Ap 24	My 4	My 14	My 24	Je 3	Je 13	Je 23	Jl 3	Jl 13	Jl 23	Au 2	Au 12	Au 22	S 1	S 11	S 21	O 1
1979	Mars	341·4	349·3	356·8	4·5	12·0	19·3	26·6	33·9	41·2	48·2	54·9	61·8	68·4	75·1	81·5	87·7	94·0	100·0
	Merc. ..	334·9	343·2	357·3	11·8	33·4	52·5	71·0	88·0	101·5	109·1	106·8	99·6	100·0	109·1	123·8	140·5	158·3	175·9
	Jup	94·3	95·0	95·9	97·2	98·8	100·4	102·3	104·4	106·4	108·5	110·8	113·0	115·2	117·4	119·7	121·9	123·9	126·1
	Ven.	325·2	337·5	349·5	1·7	13·7	26·0	38·2	50·4	62·4	74·6	86·8	99·2	111·1	123·7	136·0	148·3	160·7	178·1
	Sat ..	135·3	135·0	134·7	134·5	134·8	135·1	135·4	136·2	137·0	137·7	138·8	139·9	141·1	142·3	143·5	144·8	146·1	147·4
	Eng. date	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1980	Mars .	122·8	124·0	126·3	129·3	133·0	137·1	141·9	146·8	152·2	157·8	163·7	169·5	175·7	181·9	188·5	195·0	201·7	208·6
	Merc. .	335·5	352·1	10·1	29·2	48·0	65·5	80·4	89·7	89·8	82·3	80·4	88·3	102·4	119·0	136·8	154·7	172·1	187·5
	Jup ..	125·6	125·3	125·3	125·6	126·3	127·1	128·4	129·8	131·4	133·1	135.1	137·1	139·2	141·4	143·5	145·7	148·0	150·2
	Ven. ...	45·5	54·5	61·9	67·4	70·0	68·5	63·9	57·5	53·1	52·7	56·0	62·0	69·8	79·0	88·6	99·0	109·9	120·9
	Sat.	149·0	148·5	148·0	147·5	147·5	147·6	147·6	148·2	148·8	149·3	150·3	151·2	152·2	153·4	154·6	155·8	157·1	158·4
1981	Mars	357·3	4·7	12·4	19·7	27·0	34·3	41·5	48·5	55·5	62·3	69·3	76·0	82·6	89·7	95·5	101·8	108·0	114·1
	Merc. ..	347·8	6·4	25·3	43·1	58·8	69·7	71·7	65·2	61·3	67·9	80·8	97·1	115·0	133·3	151·1	166·4	180.6	187·7
	Jup ...	158·8	157·7	156·8	156·1	155·7	155·7	155·9	156·6	157·4	158·6	159·9	161·5	163·3	165·1	167·1	169·2	171·4	173·5
	Ven ..	1·7	13·8	26·4	38·6	51·2	63·3	75·4	87·5	99·6	111·7	123·8	135·8	147·6	159·8	171·5	183·3	195·0	206·6
	Sat	162·1	161·7	161·0	160·4	160·2	160·0	159·8	160·1	160·4	160·8	161·6	162·4	163·2	164·3	165·4	166·5	167·7	168·9
1982	Mars .	160·0	157·3	156·1	156·6	157·4	159·9	162·9	166·8	171·0	175·8	181·1	186·5	192·4	198·7	204·8	211·2	218·0	224·9
	Merc. ...	2·4	20·5	36·5	16·6	52·7	47·0	12·0	46·9	58·8	74·8	92·8	111·3	129·5	146·4	161·0	170·3	170·6	163·7
	Jup ..	192·9	191·6	190·4	189·0	187·8	186·9	186·2	185·8	185·8	186·0	186·6	187·5	188·6	189·9	191·4	193·2	195·1	197·1
	Ven. ..	313·6	324·0	335·3	346·6	358·1	9·6	21·5	33·2	45·0	56·9	69·0	81·0	93·2	105·4	117·6	129·7	142·2	154·4
	Sat. ...	175·4	174·7	174·0	173·2	172·8	172·4	172·0	172·1	172·2	172·2	172·8	173·4	174·1	175·0	176·0	177·0	178·2	173·4
	Eng date	Ap 14	Ap 24	My 4	My 14	My 24	Je 3	Je 13	Je 23	Jl 3	Jl 13	Jl 23	Au 2	Au 12	Au 22	S 1	S 11	S 21	O 1
1983	Mars	12·4	19·8	26·9	34·2	41·3	48·4	55·4	62·0	69·0	75·7	82·3	89·1	95·4	102·1	108·4	114·6	121·1	127·3
	Merc. .	14·5	27·5	33·3	29·3	23·0	25·7	37·0	52·6	70·5	89·2	107·7	125·3	140·6	151·6	154·6	148·5	143·2	147·9
	Jup	226·6	225·9	224·9	223·7	222·4	221·0	219·7	218·5	217·7	216·9	216·4	216·4	216·7	217·3	218·2	219·3	220·7	222·3
	Ven.	37·1	18·7	60·2	71·5	82·5	93·2	103·2	112·6	121·2	128·3	133·5	135·9	134·2	128·6	122·8	119·2	119·4	123·2
	Sat. ..	188·1	187·3	186·5	185·7	185·2	184·7	184·1	184·0	183·9	183·7	184·1	184·5	185·0	185·8	186·6	187·5	188·6	189·7
	Eng date	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1984	Mars	213·6	212·0	209·7	206·3	203·0	200·6	199·3	199·7	200·7	203·5	206·5	210·6	215·2	220·3	226·0	231·7	238·2	244·7
	Merc.	13·7	11·8	4·6	5·0	15·1	30·2	47·9	66·6	85·4	103·6	119·7	132·4	137·7	133·5	126·8	128·7	139·7	154·1
	Jup. ...	258·8	259·1	259·1	258·8	258·2	257·2	256·0	254·8	253·5	252·1	250·9	249·8	249·0	248·5	248·4	248·6	249·1	250·0
	Ven .	343·1	355·4	7·8	20·2	32·4	44·8	56·9	69·3	81·5	93·7	105·9	118·1	130·4	142·6	154·9	167·2	179·5	191·7
	Sat. .	200·5	199·7	198·9	198·2	197·5	196·8	196·2	195·9	195·6	195·2	195·4	195·6	195·9	196·6	197·3	198·0	199·0	200·0
1985	Mars .	27·2	34·1	41·0	48·1	54·8	61·6	68·4	75·1	81·5	88·2	94·9	101·3	107·7	114·2	120·6	127·0	133·2	139·6
	Merc.	347·1	345·1	352·9	7·5	24·9	43·4	62·6	80·9	98·2	112·0	119·6	117·7	110·1	109·7	119·3	133·3	150·0	167·7
	Jup. ..	288·8	290·2	291·3	292·3	292·8	292·9	292·8	292·3	291·6	290·5	289·2	287·8	286·4	285·2	284·1	283·1	282·6	282·2
	Ven. .	345·5	342·4	343·5	347·9	354·5	2·6	11·9	21·7	32·1	43·0	54·3	65·6	77·1	88·7	100·4	112·5	124·5	136·6
	Sat. .	212·6	211·9	211·2	210·4	209·6	208·8	208·1	207·7	207·3	206·8	206·8	206·7	206·7	207·2	207·7	208·2	209·1	210·0
1986	Mars ..	253·6	257·9	262·0	265·4	267·8	269·6	270·2	269·5	268·1	265·1	262·8	260·7	259·6	260·8	262·2	265·1	269·1	273·6
	Merc. ...	332·8	345·5	2·3	20·6	39·7	58·6	75·9	90·8	100·5	100·1	92·8	90·8	98·8	112·1	128·7	147·0	164·3	181·5
	Jup.	317·4	319·4	321·4	323·2	324·7	326·1	327·1	327·9	328·3	328·5	328·2	327·5	326·7	325·5	324·2	323·0	321·4	320·2
	Ven. ...	20·5	32·8	45·0	57·1	69·1	81·1	92·8	104·5	116·0	127·6	138·7	149·8	160·6	170·8	180·6	189·3	196·9	203·7
	Sat. ..	224·3	223·7	223·1	222·5	221·7	220·9	220·1	219·5	218·9	218·2	218·0	217·8	217·7	218·0	218·3	218·6	219·4	220·2

Mesh.	Vrsh	Mith	Kat.	Sim	Kan.	Tul	Vrsch.	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

V-B—*cont*

Mars, A.D. 1637—A.D. 1999; Mercury A.D. 1645—A.D. 1999, Jupiter, A.D. 1656—A.D. 1999; Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 11	O 21	O 31	N 10	N 20	N 30	D 10	D 20	D 30		Ja 9	Ja 19	Ja 29	F 8	F 18	F 28	Mr 9	Mr 19	Mr 29	Ap 8
62·7	65·6	67·4	68·3	67·7	65·7	63·0	59·6	56·4	**1976**	53·9	52·5	52·8	53·9	56·2	58·9	62·6	66·6	71·1	76·0
168·8	167·1	176·5	190·2	206·2	223·6	240·7	257·3	271·6		281·1	282·6	275·3	271·7	277·5	290·2	306·3	324·2	342·8	0·8
354·5	353·1	351·8	350·7	349·8	349·3	349·2	349·3	349·9		350·7	351·8	353·2	355·0	356·8	358·7	0·9	3·2	5·4	7·8
130·1	138·0	147·0	156·7	167·3	178·3	189·6	201·3	213·1		225·0	237·3	249·2	261·7	274·0	286·4	298·6	311·1	323·5	335·9
100·2	100·5	100·8	101·2	101·0	100·8	100·7	100·0	99·3		98·6	97·7	96·8	96·0	95·4	94·8	94·1	93·9	93·8	93·7
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
187·5	194·3	201·2	208·0	215·0	222·2	229·3	236·6	243·8	**1977**	251·3	258·6	266·3	273·9	281·5	289·2	297·1	304·9	312·6	320·4
157·3	170·2	186·1	203·2	220·6	237·1	252·1	263·1	266·8		261·4	255·3	258·5	269·9	285·0	302·3	320·5	338·6	356·0	10·8
35·1	34·2	33·0	31·6	30·3	29·0	27·7	26·7	26·0		25·5	25·4	25·8	26·3	27·2	28·5	30·0	31·6	33·4	35·5
203·4	215·6	227·8	239·9	252·1	264·0	275·8	287·6	299·2		310·4	321·8	331·2	340·8	349·1	355·9	1·3	1·7	358·5	352·4
112·9	113·5	114·1	114·8	114·9	115·0	115·0	114·5	114·0		113·5	112·7	111·9	111·2	110·4	109·6	108·8	108·4	108·0	107·6
88·1	93·0	97·6	101·4	104·8	107·3	109·0	109·5	108·7	**1978**	106·2	103·0	99·3	95·5	92·6	90·9	90·4	91·2	93·2	95·9
165·3	182·4	199·9	216·9	232·4	244·9	250·7	247·7	240·2		210·6	250·2	264·2	280·9	298·6	316·9	334·0	319·4	0·6	3·4
71·0	71·1	71·0	70·5	69·8	68·6	67·3	66·1	64·7		63·4	62·3	61·3	60·7	60·4	60·5	60·9	61·6	62·6	63·9
148·3	160·6	172·7	185·1	197·7	210·2	222·7	235·6	248·2		260·9	273·5	286·1	298·9	311·2	324·4	336·8	349·3	1·6	14·0
125·2	126·0	126·8	127·7	128·0	128·3	128·7	128·5	128·3		128·0	127·3	126·6	125·9	125·2	124·5	123·7	123·1	122·5	121·9
201·1	208·0	214·8	222·1	229·2	236·5	243·9	251·4	258·9	**1979**	266·6	274·4	282·1	289·8	297·7	305·5	313·5	321·5	329·2	337·2
178·2	196·6	212·8	226·2	234·5	234·0	226·9	223·3	230·2		244·2	260·1	277·6	295·5	312·8	328·5	340·2	345·3	340·1	334·0
101·3	102·5	103·4	104·0	104·3	104·3	104·0	103·3	102·3		101·1	99·8	98·5	97·1	96·1	95·0	94·1	93·8	93·6	93·9
207·4	208·1	04·7	198·9	193·7	192·3	194·7	201·0	208·4		217·1	227·1	237·5	248·1	259·9	271·4	283·0	294·8	306·7	319·5
137·0	138·0	139·0	140·0	140·6	141·2	141·7	141·7	141·7		141·7	141·2	140·7	140·2	139·4	138·6	137·8	137·1	136·1	135·6
O 11	O 21	O 31	N 10	N 20	N 30	D 10	D 20	D 30		Ja 9	Ja 19	Ja 29	F 8	F 18	F 28	Mr 9	Mr 19	Mr 29	Ap 8
105·8	111·1	116·5	121·6	126·4	130·8	134·6	137·8	140·3	**1980**	141·8	142·7	141·2	139·1	135·9	131·9	128·5	125·2	123·0	122·7
192·7	207·2	217·4	219·3	212·2	207·9	212·5	224·4	239·7		256·8	274·3	291·7	307·6	320·5	327·0	323·7	316·8	317·9	328·0
128·0	129·7	131·4	132·8	134·0	134·9	135·6	135·9	135·9		135·7	135·0	134·0	132·9	131·6	130·3	128·9	127·7	126·6	125·8
185·6	198·1	210·5	223·0	235·5	248·1	260·4	272·9	285·2		297·7	309·8	321·9	333·9	345·8	357·6	8·8	19·9	30·5	40·7
148·6	149·7	150·8	151·9	152·6	153·3	154·1	154·3	154·5		154·8	154·5	154·2	153·9	153·2	152·5	151·7	151·0	150·2	149·4
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
215·4	222·6	229·6	237·0	244·4	251·8	259·5	267·1	274·7	**1981**	282·6	290·3	2 8·4	306·2	314·0	321·3	329·8	337·7	345·3	353·0
199·3	204·0	199·3	192·7	194·6	204·8	219·4	235·9	253·1		270·7	287·1	300·7	308·6	307·9	300·4	298·9	306·8	321·1	338·1
152·2	154·3	156·1	158·3	160·1	161·8	163·2	164·3	165·3		165·9	166·3	166·3	166·0	165·3	164·4	163·5	162·1	160·8	159·5
132·5	144·2	156·0	168·1	180·2	192·5	204·8	217·2	229·8		242·2	254·8	267·2	280·0	292·5	305·1	317·7	330·1	342·6	355·0
159·6	160·7	161·8	163·0	163·9	164·8	165·7	166·1	166·5		167·0	166·9	166·9	166·8	166·2	165·6	165·1	164·3	163·5	162·7
120·2	126·1	131·8	137·5	142·9	148·5	153·2	158·0	162·3	**1982**	166·4	169·7	172·3	174·3	174·8	174·6	172·4	169·2	165·4	161·6
185·7	178·0	177·0	185·8	199·4	2 5·5	232·8	250·2	266·5		281·1	291·0	291·9	285·3	281·1	287·1	300·0	316·1	334·0	352·8
175·7	177·9	180·1	182·2	184·3	186·4	188·3	190·0	191·7		193·1	194·3	195·3	195·9	195·3	196·5	196·1	195·5	194·5	193·5
218·0	229·2	240·1	250·3	260·0	268·9	276·3	281·8	284·2		283·0	278·1	272·3	268·7	269·8	273·6	280·4	288·6	298·0	307·9
170·2	171·4	172·6	173·8	174·8	175·8	176·8	177·4	178·0		178·7	178·9	179·1	179·2	178·8	178·4	178·1	177·3	176·5	175·8
232·0	239·0	246·3	253·6	261·0	268·6	276·3	283·9	291·6	**1983**	299·4	307·3	315·0	322·8	330·5	338·2	316·0	353·5	0·9	8·4
160·0	167·0	179·3	195·1	212·2	229·6	246·2	261·3	272·6		276·1	270·2	264·7	268·3	279·0	294·6	311·9	330·3	348·7	5·8
199·2	201·4	203·6	205·8	208·0	210·2	212·4	214·6	216·6		218·5	220·3	222·0	223·6	224·9	225·8	226·6	226·9	227·1	226·9
167·0	179·4	191·9	204·5	216·9	229·5	242·2	254·8	267·4		280·5	292·7	305·2	317·6	330·0	342·3	354·6	6·7	18·8	31·0
180·5	181·4	182·9	184·2	185·3	186·4	187·5	188·3	189·1		189·9	190·8	190·5	190·9	190·7	190·5	190·4	189·8	189·2	188·6
O 11	O 21	O 31	N 10	N 20	N 30	D 10	D 20	D 30		Ja 9	Ja 19	Ja 29	F 8	F 18	F 28	Mr 9	Mr 19	Mr 29	Ap 8
133·5	139·4	145·5	151·5	157·2	163·0	168·6	174·2	179·7	**1984**	185·0	190·1	194·8	199·4	203·5	207·0	210·1	212·4	213·8	214·2
159·4	174·7	191·8	209·2	226·2	241·7	253·9	259·9	256·5		249·3	250·1	259·5	273·7	290·8	308·6	326·9	344·2	359·7	11·0
224·1	226·0	228·0	230·1	232·4	234·5	236·9	239·1	241·4		243·5	245·8	247·9	249·9	251·9	253·6	255·2	256·6	257·7	258·4
129·5	137·5	147·0	156·9	167·5	178·6	190·1	201·7	213·5		225·4	237·6	249·7	262·2	274·6	286·9	299·2	311·7	324·1	336·5
190·8	192·0	193·2	194·4	195·5	196·6	197·8	198·7	199·6		200·6	201·1	201·6	202·2	202·2	202·3	202·3	201·8	201·3	200·8
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
251·5	258·4	265·5	272·7	280·0	287·3	294·8	302·3	309·9	**1985**	317·4	324·8	332·5	340·7	347·2	354·7	1·8	4·3	16·3	23·4
171·0	188·5	205·9	222·0	235·5	243·3	212·7	235·2	232·7		239·8	253·5	269·6	287·2	305·1	322·8	338·5	350·8	355·5	351·1
251·1	252·4	254·1	255·8	257·8	259·8	262·0	264·3	266·5		268·9	271·1	273·4	275·8	278·1	280·3	282·4	284·4	286·3	288·0
203·8	216·0	228·3	210·8	252·5	264·5	276·2	288·1	299·4		310·6	321·1	331·4	340·6	348·6	354·9	358·4	358·7	354·7	348·4
201·0	202·2	203·4	204·5	205·7	206·9	208·0	209·0	210·0		211·0	211·7	212·4	213·2	213·4	213·6	213·8	213·5	213·2	212·9
145·7	152·0	158·2	164·3	170·6	176·7	182·8	188·2	194·9	**1986**	201·2	206·9	212·8	218·7	224·5	230·2	235·8	241·1	246·2	251·9
185·3	202·0	216·3	226·1	228·3	221·7	216·8	221·7	233·4		248·8	266·0	284·1	301·2	317·4	330·3	337·1	331·6	324·4	327·7
282·3	282·7	283·5	284·4	285·8	287·3	289·1	290·9	293·0		295·2	297·4	299·9	302·2	304·5	306·9	309·3	311·7	313·9	316·8
148·8	161·1	173·3	185·9	198·4	21 ·8	223·3	235·8	248·8		261·3	273·9	286·5	299·4	311·8	324·4	336·8	349·3	1·6	14·0
210·9	212·0	213·1	214·3	215·5	216·7	217·8	218·9	220·0		221·1	222·0	222·9	223·7	224·1	224·5	224·8	225·	225·2	224·5
278·3	284·4	290·4	296·8	303·2	309·9	316·4	323·0	330·0	**1987**	336·8	343·8	350·7	357·6	4·4	11·3	17·9	24·8	31·4	38·2
196·9	208·7	213·0	208·1	201·9	203·4	213·8	228·4	245·1		262·8	280·9	296·6	310·3	318·9	317·9	310·6	308·7	317·4	331·0
319·2	318·3	317·8	317·6	318·0	318·4	319·3	320·6	322·0		323·6	325·5	327·5	329·6	331·8	334·2	336·5	338·9	341·4	343·8
205·7	205·0	201·2	194·8	190·3	189·8	193·7	199·8	207·9		217·1	227·1	237·6	248·8	260·1	271·7	283·6	295·5	307·3	319·5
220·9	222·0	223·0	224·0	225·2	226·4	227·5	228·6	229·7		230·9	231·9	232·9	233·8	234·4	235·0	235·6	235·7	235·8	235·8

Mag.	P. Phal.	U. Phal	Hasta.	Chit.	Svati	Visa	Anur.	Jyesh	Mula	P Ash.	U Ash.	Srav.	Dan.	Satab.	P. Bhad.	U. Bhad	Revati
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE

Geocentric Places of Mars, Mercury, Jupiter, Venus and Saturn for every tenth day of current cycle. Venus, A.D. 1765—A.D. 1999;

Day of I.S.Y.	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
Eng. date ...	Ap 14	Ap. 24	My 4	My 14	My 24	Je 3	Je 13	Je 23	Jl 3	Jl 13	Jl 23	Au 2	Au 12	Au 22	S 1	S 11	S 21	O 1
1987 Mars ..	41·7	48·3	54·9	61·5	68·1	74·6	81·1	87·6	94·0	100·4	106·8	113·2	119·7	126·1	132·4	138·8	145·2	151·5
Merc. ...	339·9	358·0	16·7	35·5	53·5	69·1	80·2	82·4	76·0	72·1	78·0	90·8	107·2	124·9	143·1	160·6	176·9	189·9
Jup. ..	345·3	347·7	350·0	352·3	354·4	356·6	358·5	0·2	1·7	2·9	3·9	4·7	4·9	4·9	4·5	3·8	2·8	1·4
Ven. ..	325·7	337·8	350·0	2·2	14·2	26·5	38·8	50·9	63·0	75·3	87·4	99·7	111·9	124·2	136·5	149·0	161·2	173·7
Sat. ..	235·7	235·5	235·8	234·2	233·4	232·6	231·9	231·2	230·5	229·7	229·3	228·9	228·6	228·0	229·0	229·1	229·7	230·8
Eng. date .	Ap 13	Ay 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1988 Mars ...	279·2	286·0	292·3	298·8	305·2	311·2	317·1	322·8	328·1	332·8	337·1	340·2	342·4	343·2	342·8	340·7	338·0	335·7
Merc.	354·2	12·5	30·9	47·1	59·4	63·9	58·8	52·9	57·1	69·3	85·1	103·0	121·4	139·6	156·8	170·7	179·8	180·2
Jup.	12·8	15·2	17·6	20·1	22·5	24·8	27·1	29·4	31·5	33·4	35·2	36·9	38·3	39·5	40·4	40·8	41·1	41·0
Ven. ..	45·5	54·2	61·3	66·0	67·8	66·1	60·1	53·8	50·4	51·0	55·0	61·2	69·5	78·8	88·8	99·3	110·3	121·5
Sat. .	246·9	246·6	246·3	245·9	245·3	244·7	244·0	243·2	242·4	241·7	241·1	240·5	240·0	239·9	239·8	239·8	240·2	240·6
1989 Mars .	56·6	62·6	69·0	75·0	81·1	87·5	93·8	100·0	106·2	112·5	118·9	125·1	131·5	137·8	144·1	150·4	156·9	163·6
Merc.	8·3	25·0	38·3	45·5	41·1	34·3	36·7	47·4	62·8	80·8	99·6	117·6	135·3	150·5	161·1	164·4	158·6	153·1
Jup. ..	40·1	42·5	44·7	47·0	49·3	51·7	54·1	56·4	58·7	61·0	63·3	65·4	67·4	69·3	71·1	72·5	73·8	74·7
Ven. .	2·1	14·7	27·0	39·3	51·5	63·9	76·0	85·1	100·1	112·2	124·3	136·2	148·3	160·1	172·0	183·7	195·4	207·0
Sat. ...	257·9	257·8	257·6	257·5	256·9	256·3	255·7	254·9	254·1	253·3	252·7	252·1	251·4	251·2	251·0	250·7	251·0	251·3
1990 Mars ..	299·3	306·8	314·3	321·3	328·2	336·2	343·7	350·6	357·6	4·3	10·6	17·1	22·8	28·6	33·7	38·0	42·0	45·2
Merc.	16·7	24·6	22·8	15·6	16·0	25·7	40·1	58·2	76·8	95·2	115·3	129·5	142·4	147·4	143·2	136·6	138·8	148·7
Jup. .	68·6	70·0	71·8	73·7	75·7	77·8	80·0	82·2	84·5	86·9	89·1	91·3	93·6	95·8	97·9	99·9	101·9	103·6
Ven. ...	318·8	324·3	335·5	347·0	358·6	10·2	22·1	33·7	45·6	57·5	69·6	81·6	93·8	106·0	118·1	130·4	142·7	155·1
Sat. .	268·9	269·0	269·1	269·1	268·7	268·3	267·8	267·0	266·2	265·5	264·8	264·1	263·3	262·9	262·5	262·0	262·1	262·1
Eng. date .	Ap 14	Ap 24	My 4	My 14	My 24	Je 3	Je 13	Je 23	Jl 3	Jl 13	Jl 23	Au 2	Au 12	Au 22	S 1	S 11	S 21	O 1
1991 Mars ..	71·9	77·6	83·1	88·9	94·7	100·6	106·6	112·5	118·7	124·8	130·9	137·3	143·5	150·0	156·2	162·7	169·4	175·8
Merc .	5·3	357·7	355·9	3·9	18·1	35·3	53·9	73·0	91·5	105·3	122·0	129·6	127·7	120·2	120·2	128·7	143·1	159·8
Jup.	98·4	99·0	99·9	101·0	102·4	104·1	105·9	107·7	109·8	111·9	114·0	116·2	118·6	120·8	123·0	125·2	127·3	129·4
Ven. .	37·5	49·1	60·6	71·9	82·7	93·3	103·4	112·6	120·7	127·6	132·4	133·7	131·0	125·3	119·3	116·5	117·7	122·2
Sat. .	279·7	280·0	280·3	280·5	280·2	279·9	279·7	279·0	278·3	277·6	276·8	276·0	275·3	274·7	274·1	273·5	273·4	273·3
Eng. date ..	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1992 Mars ...	317·8	325·4	333·3	340·7	348·5	355·9	3·5	10·7	18·8	25·1	32·1	39·0	45·4	51·9	58·0	64·0	69·7	74·8
Merc. .	336·6	342·5	355·8	12·5	30·9	50·1	68·9	86·4	101·2	110·7	111·4	104·0	101·2	105·4	122·2	138·4	156·1	173·8
Jup. .	130·0	129·6	129·5	129·6	130·1	130·9	132·0	133·3	134·9	136·6	138·4	140·5	142·5	144·6	146·7	149·0	151·2	153·3
Ven ...	343·5	355·8	8·3	20·4	32·9	45·3	57·5	69·8	82·1	94·2	106·8	118·6	130·9	143·1	155·4	167·5	180·0	192·3
Sat. ...	290·6	291·0	291·4	291·9	291·8	291·7	291·7	291·2	290·7	290·2	289·4	288·6	287·7	287·0	286·3	285·7	285·4	285·1
1993 Mars .	89·7	94·0	98·7	103·8	109·1	114·6	120·1	125·9	131·7	137·7	143·8	149·8	156·4	162·5	168·9	175·5	182·1	188·9
Merc. ...	334·3	350·0	8·1	26·9	48·1	63·8	79·6	91·0	93·5	87·0	82·7	88·7	100·9	117·0	134·5	152·6	170·3	186·4
Jup	163·6	162·3	161·2	160·4	160·0	159·8	159·4	160·4	161·1	162·1	163·4	164·9	166·6	168·4	170·4	172·5	174·5	176·7
Ven. .	342·0	340·0	341·9	346·9	354·1	2·6	11·9	21·9	32·5	43·3	54·5	66·0	77·5	89·3	101·0	113·0	125·1	137·0
Sat ...	304·1	302·0	302·6	303·3	303·5	303·7	303·9	303·5	303·1	302·8	302·1	301·4	300·6	299·8	299·0	298·2	297·7	297·2
1994 Mars	334·9	342·6	350·4	358·0	5·6	13·0	20·6	27·6	35·1	42·0	49·0	55·7	62·5	69·1	75·5	81·7	87·9	93·5
Merc. ...	345·5	4·0	22·8	41·2	57·6	70·3	75·0	69·7	63·9	68·3	79·3	95·1	112·7	131·0	148·9	165·9	180·1	189·2
Jup .	197·7	196·4	195·0	193·7	192·5	191·3	190·6	190·1	189·9	190·1	190·4	191·2	192·2	193·5	194·9	196·6	198·6	200·5
Ven. ..	21·0	33·4	45·5	57·5	69·6	81·4	93·3	105·0	116·6	127·9	138·1	149·1	160·6	170·8	180·4	188·9	196·2	201·4
Sat ...	312·2	313·1	314·0	314·8	315·2	315·6	316·1	315·9	315·7	315·6	315·0	314·4	313·8	313·0	312·0	311·4	310·7	310·0
Eng. date .	Ap 14	Ap 24	My 4	My 14	My 24	Je 3	Je 13	Je 23	Jl 3	Jl 13	Jl 23	Au 2	Au 12	Au 22	S 1	S 11	S 21	O 1
1995 Mars ...	112·0	114·2	117·1	121·4	126·6	130·3	135·1	140·5	146·0	151·8	157·7	163·6	169·8	176·2	182·5	188·9	195·9	202·7
Merc. ...	0·4	18·7	35·1	18·9	55·5	52·2	45·5	47·3	58·0	73·3	90·7	109·4	127·5	144·9	160·2	171·1	174·1	167·7
Jup ..	231·2	230·5	229·7	228·6	227·3	225·9	224·6	223·4	222·2	221·5	220·9	220·7	220·9	221·3	222·0	223·0	224·4	225·9
Ven. ...	326·2	338·2	350·3	2·4	14·7	26·9	39·2	51·3	63·4	75·7	87·8	100·2	112·5	124·7	137·1	149·3	161·6	174·3
Sat ...	323·4	324·4	325·4	326·5	327·1	327·7	328·3	328·4	328·5	328·5	328·1	327·7	327·2	326·4	325·6	324·8	324·0	323·2
Eng. date	Ap 13	Ap 23	My 3	My 13	My 23	Je 2	Je 12	Je 22	Jl 2	Jl 12	Jl 22	Au 1	Au 11	Au 21	Au 31	S 10	S 20	S 30
1996 Mars	351·1	358·8	6·2	13·9	21·2	28·6	35·8	43·1	49·9	57·1	63·7	70·5	77·1	83·7	90·2	96·5	102·7	108·7
Merc. ...	18·2	27·4	35·3	34·4	26·9	26·6	35·8	50·8	68·4	87·1	105·1	123·5	139·8	152·1	157·3	153·5	146·5	147·9
Jup. .	263·0	263·5	263·7	263·5	263·0	262·3	261·2	259·9	258·6	257·3	256·0	254·8	253·9	253·3	253·0	253·1	253·4	254·1
Ven. ..	45·3	53·8	60·2	64·6	65·3	62·5	56·3	50·7	48·0	49·3	53·9	61·0	69·5	78·8	89·0	99·7	110·5	121·8
Sat	334·7	335·8	336·9	338·1	338·9	339·7	340·6	340·9	341·2	341·6	341·4	341·2	340·9	340·2	339·5	338·9	338·1	337·3
1997 Mars	143·5	142·5	142·7	144·4	146·9	150·0	153·7	158·1	162·9	168·3	173·8	179·5	185·5	191·8	198·2	204·6	211·3	218·3
Merc	14·9	16·1	9·0	6·4	14·8	28·4	45·6	64·0	83·1	101·4	118·3	132·0	139·7	137·7	131·9	130·0	138·9	152·3
Jup.	292·8	294·4	295·6	296·5	297·4	297·7	297·7	297·5	296·8	295·8	294·7	293·3	291·9	290·6	289·4	288·3	287·6	287·2
Ven	2·8	15·2	27·5	39·8	52·1	64·2	76·5	88·5	100·7	112·6	124·8	136·7	148·8	160·6	172·4	184·3	195·9	207·2
Sat.	346·1	347·3	348·5	349·8	350·9	351·9	352·9	353·5	354·1	354·7	354·7	354·8	354·8	354·4	354·0	353·3	352·5	351·7
1998 Mars .	6·4	13·9	21·2	28·5	35·8	43·0	50·0	56·9	63·9	70·5	77·3	84·0	90·4	96·9	103·5	109·9	116·1	122·1
Merc. ..	351·6	347·5	353·5	6·0	22·8	41·3	60·3	79·0	96·4	111·7	121·3	121·3	114·3	111·5	119·0	131·6	148·1	165·2
Jup. .	321·2	323·3	325·3	327·3	328·9	330·4	331·6	332·5	333·1	333·3	333·1	332·9	332·1	331·2	329·9	328·6	327·1	325·8
Ven. ..	314·0	324·5	335·9	347·3	359·1	10·7	22·5	34·3	46·2	58·2	70·0	82·2	94·2	106·5	118·6	131·2	143·3	155·7
Sat. ..	357·7	359·0	0·3	1·6	2·8	4·0	5·1	5·9	6·7	7·6	7·9	8·2	8·6	8·8	8·0	7·8	7·1	6·4
Eng. date	Ap 14	Ap 24	My 4	My 14	My 24	Je 3	Je 13	Je 23	Jl 3	Jl 13	Jl 23	Au 2	Au 12	Au 22	S 1	S 11	S 21	O 1
1999 Mars ..	192·1	188·9	185·2	182·7	181·1	180·8	181·7	183·8	186·9	190·7	194·9	199·8	205·2	211·0	216·9	223·2	229·7	236·2
Merc. ...	332·7	344·5	0·4	18·6	37·3	56·4	74·2	89·9	101·3	104·2	97·9	93·2	98·4	110·9	126·8	144·2	162·1	179·7
Jup ..	349·1	351·5	353·8	356·2	358·4	0·5	2·6	4·4	6·0	7·4	8·5	9·3	9·7	10·0	9·7	9·2	8·4	7·2
Ven. ..	38·0	49·5	61·2	72·1	83·0	93·4	103·3	112·5	120·5	126·6	130·6	131·0	127·5	121·2	115·7	113·8	116·0	121·1
Sat. .	9·8	11·1	12·4	13·7	15·0	16·3	17·6	18·6	19·6	20·6	21·2	21·8	22·4	22·8	22·3	22·3	21·8	21·8

Mesh.	Vrsh.	Mith	Kat	Sim	Kan	Tul	Vrch	Dhan.	Mak.	Kum.	Min.	Asvn.	Bhar.	Krit.	Rohi.	Mrig.	Ardh.	Punar.	Push.	Asles.
30	60	90	120	150	180	210	240	270	300	330	360	13·3	26·7	40·0	53·3	66·7	80·0	93·3	106·7	120·0

V-B—*cont.*

Mars, A.D. 1637—A.D. 1999; Mercury, A.D. 1645—A.D. 1999; Jupiter. A.D. 1656—A.D. 1999, Saturn, A.D. 1617—A.D. 1999—*cont.*

180	190	200	210	220	230	240	250	260		270	280	290	300	310	320	330	340	350	360
O 11	O 21	O 31	N 10	N 20	N 30	D 10	D 20	D 30		Ja 9	Ja 19	Ja 29	F 8	F 18	F 28	Mr 9	Mr 19	Mr 29	Ap 8
157·0	164·3	170·6	177·2	183·6	190·1	196·4	202·9	209·5	**1988**	215·9	222·6	229·1	235·7	242·3	249·6	255·8	262·3	269·0	275·8
196·7	194·6	186·9	186·5	194·8	208·4	224·7	241·7	259·5		276·0	290·5	300·2	301·8	294·8	291·1	296·8	309·7	326·1	344·1
0·2	358·8	357·5	356·2	355·2	354·6	354·2	354·2	354·6		355·2	356·3	357·5	359·0	0·8	2·8	4·8	6·9	9·3	11·6
186·1	198·7	211·0	223·5	236·0	248·6	260·9	273·4	285·8		298·0	310·4	322·4	334·3	346·1	357·9	9·1	20·0	30·6	40·7
230·9	231·9	232·9	233·9	235·1	236·3	237·4	238·5	239·6		240·8	241·8	242·8	243·9	244·6	245·3	246·1	246·4	246·7	246·9
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
333·6	333·3	333·7	335·5	338·3	341·8	345·8	350·3	355·2	**1989**	0·3	5·8	11·4	17·0	23·0	28·8	34·9	40·9	47·0	53·2
172·3	169·4	175·8	188·6	204·4	221·4	238·7	255·7	270·7		281·7	285·5	280·3	274·1	277·6	289·0	304·4	322·1	340·4	358·8
40·4	39·6	38·5	37·3	35·8	34·4	33·2	32·1	31·1		30·6	30·3	30·4	30·8	31·7	32·7	34·0	35·6	37·4	39·2
133·0	144·8	156·7	168·6	180·8	193·0	205·3	217·8	230·3		242·8	255·4	267·9	280·6	293·2	305·7	318·3	330·7	343·2	355·6
241·0	241·9	242·8	243·7	244·8	245·9	247·0	248·2	249·4		250·5	251·6	252·7	253·8	254·7	255·6	256·4	256·9	257·3	257·8
169·9	176·5	183·2	189·8	196·5	203·2	209·8	216·7	223·6	**1990**	230·5	237·6	244·5	251·8	258·9	266·1	273·5	280·8	288·1	295·4
157·5	168·8	184·1	201·0	218·3	235·4	250·8	263·4	270·6		266·1	258·6	259·4	268·9	283·2	300·3	318·4	336·8	354·3	10·2
75·5	75·8	75·9	75·5	74·8	73·9	72·8	71·4	70·2		68·7	67·4	66·3	65·7	65·3	65·1	65·4	65·9	66·7	67·9
218·3	229·4	240·1	250·4	259·8	268·2	275·0	280·4	281·6		279·5	278·5	268·5	266·1	267·6	272·6	279·8	288·5	298·0	308·0
251·5	252·2	252·9	253·7	254·7	255·7	256·7	257·9	259·1		260·3	261·5	262·7	263·8	264·7	265·7	266·7	267·3	267·9	268·6
47·1	47·8	47·5	46·2	43·2	40·0	37·1	35·3	34·4	**1991**	34·7	36·3	38·5	41·6	45·2	49·4	53·9	58·7	63·9	69·1
163·6	180·2	197·6	215·0	231·0	244·4	252·6	252·0	243·7		241·8	249·6	262·5	278·8	296·5	314·7	332·3	348·5	1·2	6·4
105·1	106·5	107·4	108·2	108·7	108·8	108·6	108·0	107·2		106·1	104·8	103·5	102·2	100·9	99·8	98·9	98·3	98·0	98·2
167·6	180·0	192·5	205·1	217·6	230·1	242·9	255·5	268·1		280·7	293·3	305·7	318·2	330·6	342·9	355·2	7·2	19·3	31·4
262·2	262·8	263·4	263·9	264·8	265·7	266·7	267·9	269·1		270·2	271·4	272·6	273·7	274·8	275·9	277·0	277·8	278·6	279·5
O 11	O 21	O 31	N 10	N 20	N 30	D 10	D 20	D 30		Ja 9	Ja 19	Ja 29	F 8	F 18	F 28	Mr 9	Mr 19	Mr 29	Ap 8
182·4	189·1	195·8	202·9	209·7	216·7	223·7	230·8	238·0	**1992**	245·4	252·7	260·2	267·6	275·3	282·7	290·6	298·2	305·9	313·7
177·2	194·5	211·1	225·5	235·5	237·0	230·2	225·7	230·6		242·7	258·3	275·6	293·4	310·8	327·1	340·4	347·5	344·9	337·6
131·5	133·3	134·9	136·4	137·8	138·8	139·5	140·1	140·2		140·0	139·6	138·7	137·6	136·4	135·1	133·7	132·4	131·4	130·4
129·0	137·4	146·9	157·0	168·0	178·8	190·3	202·0	213·9		225·9	238·3	250·5	262·7	275·0	287·5	299·8	312·2	324·7	337·2
273·2	273·6	274·0	274·4	275·3	276·2	277·0	278·1	279·2		280·3	281·5	282·7	283·9	285·1	286·3	287·4	288·3	289·2	290·1
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
79·6	84·0	87·4	91·2	93·3	94·6	94·8	93·4	91·0	**1993**	87·7	83·3	80·6	77·8	76·7	76·8	78·5	80·7	83·7	87·7
190·9	206·1	217·7	222·0	217·2	210·6	212·5	223·0	237·8		254·3	272·2	289·5	306·2	320·1	328·4	328·3	320·8	319·1	326·9
155·5	157·6	159·7	161·7	163·6	165·1	166·6	168·0	169·1		169·8	170·3	170·5	170·3	169·9	169·0	167·9	166·8	165·5	164·1
204·3	216·6	228·7	240·9	252·8	264·8	276·5	288·2	299·6		310·7	321·1	331·1	340·2	347·9	353·6	356·4	355·7	351·0	344·5
284·7	284·9	285·1	285·3	286·0	286·7	287·4	288·4	289·4		290·5	291·7	292·9	294·1	295·3	296·5	297·7	298·8	299·9	300·9
195·6	202·5	209·5	216·5	223·7	230·8	238·0	245·4	252·9	**1994**	260·6	268·2	275·8	283·7	291·3	299·4	307·0	314·8	322·8	330·8
199·3	206·0	203·6	196·1	195·3	204·2	217·5	233·7	251·2		268·8	285·4	300·2	310·0	311·6	305·2	300·7	307·2	319·7	336·0
178·9	181·3	183·3	185·5	187·5	189·6	191·6	193·5	195·1		196·8	198·0	199·1	199·9	200·4	200·5	200·4	200·0	199·2	198·2
149·6	161·7	174·1	186·4	199·1	211·5	224·2	236·8	249·4		262·1	274·6	287·5	300·0	312·5	325·1	337·6	350·0	2·5	14·8
296·7	296·7	296·7	296·7	297·2	297·7	298·3	299·2	300·1		301·0	302·2	303·4	304·5	305·7	306·9	308·2	309·4	310·6	311·8
99·2	104·8	109·7	114·5	118·7	122·7	126·1	128·3	129·4	**1995**	129·7	128·8	126·3	123·4	120·2	115·4	112·5	110·6	110·3	111·0
189·3	181·9	178·9	186·1	197·4	213·6	230·2	247·1	264·7		280·1	291·5	295·2	289·3	283·7	287·6	298·3	314·1	331·7	350·2
202·5	204·7	206·8	209·0	211·2	213·5	215·6	217·8	219·9		222·0	223·8	225·7	227·2	228·6	229·6	230·6	231·1	231·4	231·4
203·4	202·2	196·8*	191·0	187·4	188·0	192·4	199·1	207·1		216·9	227·2	237·9	249·1	260·5	272·1	283·9	295·9	307·9	319·9
309·3	309·1	308·9	308·6	308·9	309·2	309·6	310·4	311·2		311·9	313·0	314·1	315·3	316·5	317·7	319·0	320·2	321·4	322·7
O 11	O 21	O 31	N 10	N 20	N 30	D 10	D 20	D 30		Ja 9	Ja 19	Ja 29	F 8	F 18	F 28	Mr 9	Mr 19	Mr 29	Ap 8
209·7	216·6	223·8	231·0	238·2	245·9	253·2	260·9	268·5	**1996**	276·3	284·2	291·9	299·8	307·8	315·6	323·5	331·4	339·2	347·1
162·4	166·7	178·2	193·3	210·3	227·6	244·6	260·1	272·4		278·4	275·1	267·9	268·8	278·4	293·1	310·2	328·2	346·7	4·5
227·6	229·5	231·5	233·5	235·8	238·0	240·2	242·4	244·8		246·9	249·2	251·4	253·5	255·5	257·4	258·9	260·4	261·6	262·6
186·5	199·1	211·5	223·9	236·5	248·8	261·4	273·8	286·2		298·4	310·6	322·7	334·7	346·4	357·9	9·2	20·0	30·5	40·4
322·5	322·1	321·7	321·2	321·3	321·4	321·5	322·1	322·7		323·4	324·4	325·5	326·5	327·7	328·9	330·2	331·5	332·8	334·1
O 10	O 20	O 30	N 9	N 19	N 29	D 9	D 19	D 29		Ja 8	Ja 18	Ja 28	F 7	F 17	F 27	Mr 9	Mr 19	Mr 29	Ap 8
114·7	120·6	126·1	131·8	136·9	141·8	146·5	150·7	154·5	**1997**	157·6	160·1	161·4	161·6	160·6	158·6	154·4	150·5	146·9	144·4
158·6	172·9	189·7	206·9	224·3	240·4	253·8	261·5	260·8		253·2	251·1	258·3	272·3	288·6	306·5	324·7	342·6	358·6	11·5
255·1	256·4	257·8	259·5	261·5	263·5	265·5	267·8	270·0		272·3	274·7	277·0	279·3	281·6	284·0	286·1	288·2	290·2	292·0
133·4	145·2	157·1	169·1	181·3	193·7	205·9	218·5	231·0		243·5	256·1	268·7	281·0	293·8	306·4	318·9	331·4	343·8	356·3
336·4	335·8	335·2	334·6	334·1	334·2	334·1	334·5	334·9		335·4	336·3	337·2	338·0	339·2	340·4	341·6	342·9	344·2	345·4
225·3	232·3	239·6	246·8	254·4	261·9	269·5	277·1	285·1	**1998**	292·8	299·6	308·5	316·3	324·0	331·8	339·6	347·3	354·9	2·4
168·7	184·6	203·8	220·3	234·5	244·6	246·0	239·0	234·7		240·1	254·0	267·5	284·8	302·8	320·7	336·9	350·6	357·6	356·0
287·0	287·2	287·8	288·7	289·9	291·3	293·0	294·8	299·5		299·0	301·2	303·5	305·8	308·2	310·6	312·9	315·4	317·8	320·0
218·5	229·6	240·0	250·2	259·4	267·5	274·0	278·2	279·0		275·5	270·1	264·5	263·6	266·0	271·8	279·2	289·2	297·8	308·2
350·9	350·1	349·3	348·5	348·1	347·7	347·4	347·6	347·8		347·9	348·6	349·3	350·1	351·1	352·2	353·2	354·5	355·8	357·0
128·4	134·3	140·3	146·1	151·8	157·6	162·8	168·3	173·4	**1999**	178·0	182·8	186·8	190·6	193·7	195·8	197·4	197·4	196·5	194·0
183·4	200·0	215·3	226·9	230·9	225·7	219·2	222·0	232·2		246·8	263·9	281·4	299·2	315·8	330·1	339·1	338·6	331·1	320·7
324·6	323·6	323·1	322·7	322·6	323·1	323·8	324·8	326·2		327·7	329·4	331·3	333·5	335·7	337·9	340·4	342·7	345·2	347·6
168·2	180·6	193·2	205·7	218·2	230·7	243·5	256·1	268·7		281·4	293·9	306·3	318·7	331·3	343·4	355·8	7·8	19·9	31·9
5·7	4·9	4·1	3·2	2·6	2·0	1·4	1·3	1·2		1·1	1·6	2·1	2·5	3·4	4·3	5·1	6·4	7·7	8·9
O 11	O 21	O 31	N 10	N 20	N 30	D 10	D 20	D 30		Ja 9	Ja 19	Ja 29	F 8	F 18	F 28	Mr 9	Mr 19	Mr 29	Ap 8
243·3	250·4	257·5	264·9	272·3	279·8	287·5	295·1	302·7	**2000**	310·3	318·8	325·7	333·1	340·8	348·2	355·7	3·0	10·2	17·5
195·5	208·5	215·0	212·6	204·9	204·6	212·9	226·9	243·2		260·4	278·3	295·0	309·6	319·8	321·8	315·0	310·9	316·7	329·8
5·9	4·5	3·2	1·8	0·7	0·0	359·4	359·1	359·4		359·9	0·7	1·9	3·3	4·9	6·6	8·7	10·9	13·0	15·4
128·5	137·2	146·8	157·1	168·0	179·2	190·6	202·5	214·4		226·4	238·7	251·0	263·3	275·6	288·0	300·4	312·9	325·2	337·7
20·7	19·9	19·1	18·2	17·5	16·8	16·0	15·6	15·2		14·9	15·1	15·3	15·6	16·4	17·2	17·9	19·0	20·1	21·3

Mag.	P Phal.	U. Phal.	Hasta.	Chit.	Svati.	Visa.	Anur.	Jyesh.	Mula.	P. Ash.	U. Ash.	Śrav.	Dan.	Satab.	P. Bhad.	U. Bhad.	Revati.
133·3	146·7	160·0	173·3	186·7	200·0	213·3	226·7	240·0	253·3	266·7	280·0	293·3	306·7	320·0	333·3	346·7	360·0

TABLE VI.

Ghaṭikās and Palas (Naligais and Vinadis) as Fractions of a day.

N.B.—The same table will serve for minutes and seconds as fractions of an **Hour** or a **Degree**.

Ghaṭikās. 0	1	2	3	4	Palas.	Ghaṭikās. 5	6	7	8	9	Palas.	Ghaṭikās. 10	11	12	13	14	Palas.	Ghaṭikās. 15	16	17	18	19
	·0167	·0333	·0500	·0667	**0**	·0833	·1000	·1167	·1333	·1500	**0**	·1667	·1833	·2000	·2167	·2333	**0**	·2500	·2667	·2833	·3000	·3167
·0003	·0169	·0336	·0503	·0669	**1**	·0836	·1003	·1169	·1336	·1503	**1**	·1669	·1836	·2003	·2169	·2336	**1**	·2503	·2669	·2836	·3003	·3169
·0005	·0172	·0339	·0505	·0672	**2**	·0839	·1005	·1172	·1339	·1505	**2**	·1672	·1839	·2005	·2172	·2339	**2**	·2505	·2672	·2839	·3005	·3172
·0008	·0175	·0342	·0508	·0675	**3**	·0842	·1008	·1175	·1342	·1508	**3**	·1675	·1842	·2008	·2175	·2342	**3**	·2508	·2675	·2842	·3008	·3175
·0011	·0178	·0344	·0511	·0678	**4**	·0844	·1011	·1178	·1344	·1511	**4**	·1678	·1844	·2011	·2178	·2344	**4**	·2511	·2678	·2844	·3011	·3178
·0014	·0180	·0347	·0514	·0680	**5**	·0847	·1014	·1180	·1347	·1514	**5**	·1680	·1847	·2014	·2180	·2347	**5**	·2514	·2680	·2847	·3014	·3180
·0017	·0183	·0350	·0517	·0683	**6**	·0850	·1017	·1183	·1350	·1517	**6**	·1683	·1850	·2017	·2183	·2350	**6**	·2517	·2683	·2850	·3017	·3183
·0019	·0186	·0353	·0519	·0686	**7**	·0853	·1019	·1186	·1353	·1519	**7**	·1686	·1853	·2019	·2186	·2353	**7**	·2519	·2686	·2853	·3019	·3186
·0022	·0189	·0355	·0522	·0689	**8**	·0855	·1022	·1189	·1355	·1522	**8**	·1689	·1855	·2022	·2189	·2355	**8**	·2522	·2689	·2855	·3022	·3189
·0025	·0192	·0358	·0525	·0692	**9**	·0858	·1025	·1192	·1358	·1525	**9**	·1692	·1858	·2025	·2192	·2358	**9**	·2525	·2692	·2858	·3025	·3192
·0028	·0194	·0361	·0528	·0694	**10**	·0861	·1028	·1194	·1361	·1528	**10**	·1694	·1861	·2028	·2194	·2361	**10**	·2528	·2694	·2861	·3028	·3194
·0030	·0197	·0364	·0530	·0697	**11**	·0864	·1030	·1197	·1364	·1530	**11**	·1697	·1864	·2030	·2197	·2364	**11**	·2530	·2697	·2864	·3030	·3197
·0033	·0200	·0367	·0533	·0700	**12**	·0867	·1033	·1200	·1367	·1533	**12**	·1700	·1867	·2033	·2200	·2367	**12**	·2533	·2700	·2867	·3033	·3200
·0036	·0203	·0369	·0536	·0703	**13**	·0869	·1036	·1203	·1369	·1536	**13**	·1703	·1869	·2036	·2203	·2369	**13**	·2536	·2703	·2869	·3036	·3203
·0039	·0205	·0372	·0539	·0705	**14**	·0872	·1039	·1205	·1372	·1539	**14**	·1705	·1872	·2039	·2205	·2372	**14**	·2539	·2705	·2872	·3039	·3205
·0042	·0208	·0375	·0542	·0708	**15**	·0875	·1042	·1208	·1375	·1542	**15**	·1708	·1875	·2042	·2208	·2375	**15**	·2542	·2708	·2875	·3042	·3208
·0044	·0211	·0378	·0544	·0711	**16**	·0878	·1044	·1211	·1378	·1544	**16**	·1711	·1878	·2044	·2211	·2378	**16**	·2544	·2711	·2878	·3044	·3211
·0047	·0214	·0380	·0547	·0714	**17**	·0880	·1047	·1214	·1380	·1547	**17**	·1714	·1880	·2047	·2214	·2380	**17**	·2547	·2714	·2880	·3047	·3214
·0050	·0217	·0383	·0550	·0717	**18**	·0883	·1050	·1217	·1383	·1550	**18**	·1717	·1883	·2050	·2217	·2383	**18**	·2550	·2717	·2883	·3050	·3217
·0053	·0219	·0386	·0553	·0719	**19**	·0886	·1053	·1219	·1386	·1553	**19**	·1719	·1886	·2053	·2219	·2386	**19**	·2553	·2719	·2886	·3053	·3219
·0055	·0222	·0389	·0555	·0722	**20**	·0889	·1055	·1222	·1389	·1555	**20**	·1722	·1889	·2055	·2222	·2389	**20**	·2555	·2722	·2889	·3355	·3222
·0058	·0225	·0392	·0558	·0725	**21**	·0892	·1058	·1225	·1392	·1558	**21**	·1725	·1892	·2058	·2225	·2392	**21**	·2558	·2725	·2892	·3058	·3225
·0061	·0228	·0394	·0561	·0728	**22**	·0894	·1061	·1228	·1394	·1561	**22**	·1728	·1894	·2061	·2228	·2394	**22**	·2561	·2728	·2894	·3061	·3228
·0064	·0230	·0397	·0564	·0730	**23**	·0897	·1064	·1230	·1397	·1564	**23**	·1730	·1897	·2064	·2230	·2397	**23**	·2564	·2730	·2897	·3064	·3230
·0067	·0233	·0400	·0567	·0733	**24**	·0900	·1067	·1233	·1400	·1567	**24**	·1733	·1900	·2067	·2233	·2400	**24**	·2567	·2733	·2900	·3067	·3233
·0069	·0236	·0403	·0569	·0736	**25**	·0903	·1069	·1236	·1403	·1569	**25**	·1736	·1903	·2069	·2236	·2403	**25**	·2569	·2736	·2903	·3069	·3236
·0072	·0239	·0405	·0572	·0739	**26**	·0905	·1072	·1239	·1405	·1572	**26**	·1739	·1905	·2072	·2239	·2405	**26**	·2572	·2739	·2905	·3072	·3239
·0075	·0242	·0408	·0575	·0742	**27**	·0908	·1075	·1242	·1408	·1575	**27**	·1742	·1908	·2075	·2242	·2408	**27**	·2575	·2742	·2908	·3075	·3242
·0078	·0244	·0411	·0578	·0744	**28**	·0911	·1078	·1244	·1411	·1578	**28**	·1744	·1911	·2078	·2244	·2411	**28**	·2578	·2744	·2911	·3078	·3244
·0080	·0247	·0414	·0580	·0747	**29**	·0914	·1080	·1247	·1414	·1580	**29**	·1747	·1914	·2080	·2247	·2414	**29**	·2580	·2747	·2914	·3080	·3247
·0083	·0250	·0417	·0583	·0750	**30**	·0917	·1083	·1250	·1417	·1583	**30**	·1750	·1917	·2083	·2250	·2417	**30**	·2583	·2750	·2917	·3083	·3250
·0086	·0253	·0419	·0586	·0753	**31**	·0919	·1086	·1253	·1419	·1586	**31**	·1753	·1919	·2086	·2253	·2419	**31**	·2586	·2753	·2919	·3086	·3253
·0089	·0255	·0422	·0589	·0755	**32**	·0922	·1089	·1255	·1422	·1589	**32**	·1755	·1922	·2089	·2255	·2422	**32**	·2589	·2755	·2922	·3089	·3255
·0092	·0258	·0425	·0592	·0758	**33**	·0925	·1092	·1258	·1425	·1592	**33**	·1758	·1925	·2092	·2258	·2425	**33**	·2592	·2758	·2925	·3092	·2258
·0094	·0261	·0428	·0594	·0761	**34**	·0928	·1094	·1261	·1428	·1594	**34**	·1761	·1928	·2094	·2261	·2428	**34**	·2594	·2761	·2928	·3094	·3261
·0097	·0264	·0430	·0597	·0764	**35**	·0930	·1097	·1264	·1430	·1597	**35**	·1764	·1930	·2097	·2264	·2430	**35**	·2597	·2764	·2930	·3097	·3264
·0100	·0267	·0433	·0600	·0767	**36**	·0933	·1100	·1267	·1433	·1600	**36**	·1767	·1933	·2100	·2267	·2433	**36**	·2600	·2767	·2933	·3100	·3267
·0103	·0269	·0436	·0603	·0769	**37**	·0936	·1103	·1269	·1436	·1603	**37**	·1769	·1936	·2103	·2269	·2436	**37**	·2603	·2769	·2936	·3103	·3269
·0105	·0272	·0439	·0605	·0772	**38**	·0939	·1105	·1272	·1439	·1605	**38**	·1772	·1939	·2105	·2272	·2439	**38**	·2605	·2772	·2939	·3105	·3272
·0108	·0275	·0442	·0608	·0775	**39**	·0942	·1108	·1275	·1442	·1608	**39**	·1775	·1942	·2108	·2275	·2442	**39**	·2608	·2775	·2942	·3108	·3275
·0111	·0278	·0444	·0611	·0778	**40**	·0944	·1111	·1278	·1444	·1611	**40**	·1778	·1944	·2111	·2278	·2444	**40**	·2611	·2778	·2944	·3111	·3278
·0114	·0280	·0447	·0614	·0780	**41**	·0947	·1114	·1280	·1447	·1614	**41**	·1780	·1947	·2114	·2280	·2447	**41**	·2614	·2780	·2947	·3114	·3280
·0117	·0283	·0450	·0617	·0783	**42**	·0950	·1117	·1283	·1450	·1617	**42**	·1783	·1950	·2117	·2283	·2450	**42**	·2617	·2783	·2950	·3117	·3283
·0119	·0286	·0453	·0619	·0786	**43**	·0953	·1119	·1286	·1453	·1619	**43**	·1786	·1953	·2119	·2286	·2453	**43**	·2619	·2786	·2953	·3119	·3286
·0122	·0289	·0455	·0622	·0789	**44**	·0955	·1122	·1289	·1455	·1622	**44**	·1789	·1955	·2122	·2289	·2455	**44**	·2622	·2789	·2955	·3122	·3289
·0125	·0292	·0458	·0625	·0792	**45**	·0958	·1125	·1292	·1458	·1625	**45**	·1792	·1958	·2125	·2292	·2458	**45**	·2625	·2792	·2958	·3125	·3292
·0128	·0294	·0461	·0628	·0794	**46**	·0961	·1128	·1294	·1461	·1628	**46**	·1794	·1961	·2128	·2294	·2461	**46**	·2628	·2794	·2961	·3128	·3294
·0130	·0297	·0464	·0630	·0797	**47**	·0964	·1130	·1297	·1464	·1630	**47**	·1797	·1964	·2130	·2297	·2464	**47**	·2630	·2797	·2964	·3130	·3297
·0133	·0300	·0467	·0633	·0800	**48**	·0967	·1133	·1300	·1467	·1633	**48**	·1800	·1967	·2133	·2300	·2467	**48**	·2633	·2800	·2967	·3133	·3300
·0136	·0303	·0469	·0636	·0803	**49**	·0969	·1136	·1303	·1470	·1636	**49**	·1803	·1969	·2136	·2303	·2469	**49**	·2636	·2803	·2969	·3136	·3303
·0139	·0305	·0472	·0639	·0805	**50**	·0972	·1139	·1305	·1472	·1639	**50**	·1805	·1972	·2139	·2305	·2472	**50**	·2639	·2805	·2972	·3139	·3305
·0142	·0308	·0475	·0642	·0808	**51**	·0975	·1142	·1308	·1475	·1642	**51**	·1808	·1975	·2142	·2308	·2475	**51**	·2642	·2808	·2975	·3142	·3308
·0144	·0311	·0478	·0644	·0811	**52**	·0978	·1144	·1311	·1478	·1644	**52**	·1811	·1978	·2144	·2311	·2478	**52**	·2644	·2811	·2978	·3144	·3311
·0147	·0314	·0480	·0647	·0814	**53**	·0980	·1147	·1314	·1480	·1647	**53**	·1814	·1980	·2147	·2314	·2480	**53**	·2647	·2814	·2980	·3147	·3314
·0150	·0317	·0483	·0650	·0817	**54**	·0983	·1150	·1317	·1483	·1650	**54**	·1817	·1983	·2150	·2317	·2483	**54**	·2650	·2817	·2983	·3150	·3317
·0153	·0319	·0486	·0653	·0819	**55**	·0986	·1153	·1319	·1486	·1653	**55**	·1819	·1986	·2153	·2319	·2486	**55**	·2653	·2819	·2986	·3153	·3319
·0155	·0322	·0489	·0655	·0822	**56**	·0989	·1155	·1322	·1489	·1655	**56**	·1822	·1989	·2155	·2322	·2489	**56**	·2655	·2822	·2989	·3155	·3322
·0158	·0325	·0492	·0658	·0825	**57**	·0992	·1158	·1325	·1492	·1658	**57**	·1825	·1992	·2158	·2325	·2492	**57**	·2658	·2825	·2992	·3158	·3325
·0161	·0328	·0494	·0661	·0828	**58**	·0994	·1161	·1328	·1494	·1661	**58**	·1828	·1994	·2161	·2328	·2494	**58**	·2661	·2828	·2994	·3161	·3328
·0164	·0330	·0497	·0664	·0830	**59**	·0997	·1164	·1330	·1497	·1664	**59**	·1830	·1997	·2164	·2330	·2497	**59**	·2664	·2830	·2997	·3164	·3330

TABLE VI—*cont.*

Ghaṭikās and Palas (Naligais and Vinadis) as Fractions of a day—*cont.*

N.B.—The same table will serve for minutes and seconds as fractions of an **Hour** or a **Degree**.

Ghaṭikās.					Palas.	Ghaṭikās.					Palas.	Ghaṭikās.					Palas	Ghaṭikās				
20	**21**	**22**	**23**	**24**		**25**	**26**	**27**	**28**	**29**		**30**	**31**	**32**	**33**	**34**		**35**	**36**	**37**	**38**	**39**
·3333	·3500	·3667	·3833	·4000	**0**	·4167	·4333	·4500	·4667	·4833	**0**	·5000	·5167	·5333	·5500	·5667	**0**	·5833	·6000	·6167	·6333	·6500
·3336	·3503	·3669	·3836	·4003	**1**	·4169	·4336	·4503	·4669	·4836	**1**	·5003	·5169	·5336	·5503	·5669	**1**	·5836	·6003	·6169	·6336	·6503
·3339	·3505	·3672	·3839	·4005	**2**	·4172	·4339	·4505	·4672	·4839	**2**	·5005	·5172	·5339	·5505	·5672	**2**	·5839	·6005	·6172	·6339	·6506
·3342	·3508	·3675	·3842	·4008	**3**	·4175	·4342	·4508	·4675	·4842	**3**	·5008	·5175	·5342	·5508	·5675	**3**	·5842	·6008	·6175	·6342	·6508
·3344	·3511	·3678	·3844	·4011	**4**	·4178	·4344	·4511	·4678	·4844	**4**	·5011	·5178	·5344	·5511	·5678	**4**	·5844	·6011	·6178	·6344	·6511
·3347	·3514	·3680	·3847	·4014	**5**	·4180	·4347	·4514	·4680	·4847	**5**	·5014	·5180	·5347	·5514	·5680	**5**	·5847	·6014	·6180	·6347	·6514
·3350	·3517	·3683	·3850	·4017	**6**	·4183	·4350	·4517	·4683	·4850	**6**	·5017	·5183	·5350	·5517	·5683	**6**	·5850	·6017	·6183	·6350	·6517
·3353	·3519	·3686	·3853	·4019	**7**	·4186	·4353	·4519	·4686	·4853	**7**	·5019	·5186	·5353	·5519	·5686	**7**	·5853	·6019	·6186	·6353	·6519
·3355	·3522	·3689	·3855	·4022	**8**	·4189	·4355	·4522	·4689	·4855	**8**	·5022	·5189	·5355	·5522	·5689	**8**	·5855	·6022	·6189	·6355	·6522
·3358	·3525	·3692	·3858	·4025	**9**	·4192	·4358	·4525	·4692	·4858	**9**	·5025	·5192	·5358	·5525	·5692	**9**	·5858	·6025	·6192	·6358	·6525
·3361	·3528	·3694	·3861	·4028	**10**	·4194	·4361	·4528	·4694	·4861	**10**	·5028	·5194	·5361	·5528	·5694	**10**	·5861	·6028	·6194	·6361	·6528
·3364	·3530	·3697	·3864	·4030	**11**	·4197	·4364	·4530	·4697	·4864	**11**	·5030	·5197	·5364	·5530	·5697	**11**	·5864	·6030	·6197	·6364	·6530
·3367	·3533	·3700	·3867	·4033	**12**	·4200	·4367	·4533	·4700	·4867	**12**	·5033	·5200	·5367	·5533	·5700	**12**	·5867	·6033	·6200	·6367	·6533
·3369	·3536	·3703	·3869	·4036	**13**	·4203	·4369	·4536	·4703	·4869	**13**	·5036	·5203	·5369	·5536	·5703	**13**	·5869	·6036	·6203	·6369	·6536
·3372	·3539	·3705	·3872	·4039	**14**	·4205	·4372	·4539	·4705	·4872	**14**	·5039	·5205	·5372	·5539	·5705	**14**	·5872	·6039	·6205	·6372	·6539
·3375	·3542	·3708	·3875	·4042	**15**	·4208	·4375	·4542	·4708	·4875	**15**	·5042	·5208	·5375	·5542	·5708	**15**	·5875	·6042	·6208	·6375	·6542
·3378	·3544	·3711	·3878	·4044	**16**	·4211	·4378	·4544	·4711	·4878	**16**	·5044	·5211	·5378	·5544	·5711	**16**	·5878	·6044	·6211	·6378	·6544
·3380	·3547	·3714	·3880	·4047	**17**	·4214	·4380	·4547	·4714	·4880	**17**	·5047	·5214	·5380	·5547	·5714	**17**	·5880	·6047	·6214	·6380	·6547
·3383	·3550	·3717	·3883	·4050	**18**	·4217	·4383	·4550	·4717	·4883	**18**	·5050	·5217	·5383	·5550	·5717	**18**	·5883	·6050	·6217	·6383	·6550
·3386	·3553	·3719	·3886	·4053	**19**	·4219	·4386	·4553	·4719	·4886	**19**	·5053	·5219	·5386	·5553	·5719	**19**	·5886	·6053	·6219	·6386	·6553
·3389	·3555	·3722	·3889	·4055	**20**	·4222	·4389	·4555	·4722	·4889	**20**	·5055	·5222	·5389	·5555	·5722	**20**	·5889	·6055	·6222	·6389	·6555
·3392	·3558	·3725	·3892	·4058	**21**	·4225	·4392	·4558	·4725	·4892	**21**	·5058	·5225	·5392	·5558	·5725	**21**	·5892	·6058	·6225	·6392	·6558
·3394	·3561	·3728	·3894	·4061	**22**	·4228	·4394	·4561	·4728	·4894	**22**	·5061	·5228	·5394	·5561	·5728	**22**	·5894	·6061	·6228	·6394	·6561
·3397	·3564	·3730	·3897	·4064	**23**	·4230	·4397	·4564	·4730	·4897	**23**	·5064	·5230	·5397	·5564	·5730	**23**	·5897	·6064	·6230	·6397	·6564
·3400	·3567	·3733	·3900	·4067	**24**	·4233	·4400	·4567	·4733	·4900	**24**	·5067	·5233	·5400	·5567	·5733	**24**	·5900	·6067	·6233	·6400	·6567
·3403	·3569	·3736	·3903	·4069	**25**	·4236	·4403	·4569	·4736	·4903	**25**	·5069	·5236	·5403	·5569	·5736	**25**	·5903	·6069	·6236	·6403	·6569
·3405	·3572	·3739	·3905	·4072	**26**	·4239	·4405	·4572	·4739	·4905	**26**	·5072	·5239	·5405	·5572	·5739	**26**	·5905	·6072	·6239	·6405	·6572
·3408	·3575	·3742	·3908	·4075	**27**	·4242	·4408	·4575	·4742	·4908	**27**	·5075	·5242	·5408	·5575	·5742	**27**	·5908	·6075	·6242	·6408	·6575
·3411	·3578	·3744	·3911	·4078	**28**	·4244	·4411	·4578	·4744	·4911	**28**	·5078	·5244	·5411	·5578	·5744	**28**	·5911	·6078	·6244	·6411	·6578
·3414	·3580	·3747	·3914	·4080	**29**	·4247	·4414	·4580	·4747	·4914	**29**	·5080	·5247	·5414	·5580	·5747	**29**	·5914	·6080	·6247	·6414	·6580
·3417	·3583	·3750	·3917	·4083	**30**	·4250	·4417	·4583	·4750	·4917	**30**	·5083	·5250	·5417	·5583	·5750	**30**	·5917	·6083	·6250	·6417	·6583
·3419	·3586	·3753	·3919	·4086	**31**	·4253	·4419	·4586	·4753	·4919	**31**	·5086	·5253	·5419	·5586	·5753	**31**	·5919	·6086	·6253	·6419	·6586
·3422	·3589	·3755	·3922	·4089	**32**	·4255	·4422	·4589	·4755	·4922	**32**	·5089	·5255	·5422	·5589	·5755	**32**	·5922	·6089	·6255	·6422	·6589
·3425	·3592	·3758	·3925	·4092	**33**	·4258	·4425	·4592	·4758	·4925	**33**	·5092	·5258	·5425	·5592	·5758	**33**	·5925	·6092	·6258	·6425	·6592
·3428	·3594	·3761	·3928	·4094	**34**	·4261	·4428	·4594	·4761	·4928	**34**	·5094	·5261	·5428	·5594	·5761	**34**	·5928	·6094	·6261	·6428	·6594
·3430	·3597	·3764	·3930	·4097	**35**	·4264	·4431	·4597	·4764	·4930	**35**	·5097	·5264	·5431	·5597	·5764	**35**	·5930	·6097	·6264	·6431	·6597
·3433	·3600	·3767	·3933	·4100	**36**	·4267	·4433	·4600	·4767	·4933	**36**	·5100	·5267	·5433	·5600	·5767	**36**	·5933	·6100	·6267	·6433	·6600
·3436	·3603	·3769	·3936	·4103	**37**	·4269	·4436	·4603	·4769	·4936	**37**	·5103	·5269	·5436	·5603	·5769	**37**	·5936	·6103	·6269	·6436	·6603
·3439	·3605	·3772	·3939	·4105	**38**	·4272	·4439	·4605	·4772	·4939	**38**	·5105	·5272	·5439	·5605	·5772	**38**	·5939	·6105	·6272	·6439	·6605
·3442	·3608	·3775	·3942	·4108	**39**	·4275	·4442	·4608	·4775	·4942	**39**	·5108	·5275	·5442	·5608	·5775	**39**	·5942	·6108	·6275	·6442	·6608
·3444	·3611	·3778	·3944	·4111	**40**	·4278	·4444	·4611	·4778	·4944	**40**	·5111	·5278	·5444	·5611	·5778	**40**	·5944	·6111	·6278	·6444	·6611
·3447	·3614	·3780	·3947	·4114	**41**	·4280	·4447	·4614	·4780	·4947	**41**	·5114	·5280	·5447	·5614	·5780	**41**	·5947	·6114	·6280	·6447	·6614
·3450	·3617	·3783	·3950	·4117	**42**	·4283	·4450	·4617	·4783	·4950	**42**	·5117	·5283	·5450	·5617	·5783	**42**	·5950	·6117	·6283	·6450	·6617
·3453	·3619	·3786	·3953	·4119	**43**	·4286	·4453	·4619	·4786	·4953	**43**	·5119	·5286	·5453	·5619	·5786	**43**	·5953	·6119	·6286	·6453	·6619
·3455	·3622	·3789	·3955	·4122	**44**	·4289	·4455	·4622	·4789	·4955	**44**	·5122	·5289	·5455	·5622	·5789	**44**	·5955	·6122	·6289	·6455	·6622
·3458	·3625	·3792	·3958	·4125	**45**	·4292	·4458	·4625	·4792	·4958	**45**	·5125	·5292	·5458	·5625	·5792	**45**	·5958	·6125	·6292	·6458	·6625
·3461	·3628	·3794	·3961	·4128	**46**	·4294	·4461	·4628	·4794	·4961	**46**	·5128	·5294	·5461	·5628	·5794	**46**	·5961	·6128	·6294	·6461	·6628
·3464	·3630	·3797	·3964	·4130	**47**	·4297	·4464	·4630	·4797	·4964	**47**	·5130	·5297	·5464	·5630	·5797	**47**	·5964	·6130	·6297	·6464	·6630
·3467	·3633	·3800	·3967	·4133	**48**	·4300	·4467	·4633	·4800	·4967	**48**	·5133	·5300	·5467	·5633	·5800	**48**	·5967	·6133	·6300	·6467	·6633
·3469	·3636	·3803	·3969	·4136	**49**	·4303	·4469	·4636	·4803	·4969	**49**	·5136	·5303	·5469	·5636	·5803	**49**	·5969	·6136	·6303	·6469	·6636
·3472	·3639	·3805	·3972	·4139	**50**	·4305	·4472	·4639	·4805	·4972	**50**	·5139	·5305	·5472	·5639	·5805	**50**	·5972	·6139	·6305	·6472	·6639
·3475	·3642	·3808	·3975	·4142	**51**	·4308	·4475	·4642	·4808	·4975	**51**	·5142	·5308	·5475	·5642	·5808	**51**	·5975	·6142	·6308	·6475	·6642
·3478	·3644	·3811	·3978	·4144	**52**	·4311	·4478	·4644	·4811	·4978	**52**	·5144	·5311	·5478	·5644	·5811	**52**	·5978	·6144	·6311	·6478	·6644
·3480	·3647	·3814	·3980	·4147	**53**	·4314	·4480	·4647	·4814	·4980	**53**	·5147	·5314	·5480	·5647	·5814	**53**	·5980	·6147	·6314	·6480	·6647
·3483	·3650	·3817	·3983	·4150	**54**	·4317	·4483	·4650	·4817	·4983	**54**	·5150	·5317	·5483	·5650	·5817	**54**	·5983	·6150	·6317	·6483	·6650
·3486	·3653	·3819	·3986	·4153	**55**	·4319	·4486	·4653	·4819	·4986	**55**	·5153	·5319	·5486	·5653	·5819	**55**	·5986	·6153	·6319	·6486	·6653
·3489	·3655	·3822	·3989	·4155	**56**	·4322	·4489	·4655	·4822	·4989	**56**	·5155	·5322	·5489	·5655	·5822	**56**	·5989	·6155	·6322	·6489	·6655
·3492	·3658	·3825	·3992	·4158	**57**	·4325	·4492	·4658	·4825	·4992	**57**	·5158	·5325	·5492	·5658	·5825	**57**	·5992	·6158	·6325	·6492	·6658
·3494	·3661	·3828	·3994	·4161	**58**	·4328	·4494	·4661	·4828	·4994	**58**	·5161	·5328	·5494	·5661	·5828	**58**	·5994	·6161	·6328	·6494	·6661
·3497	·3664	·3830	·3997	·4164	**59**	·4330	·4497	·4664	·4830	·4997	**59**	·5164	·5330	·5497	·5664	·5830	**59**	·5997	·6164	·6330	·6497	·6664

TABLE VI—*cont.*

Ghaṭikās and Palas (Nāligais and Vinadis) as Fractions of a day—*cont.*

N.B.—The same table will serve for minutes and seconds as fractions of an **Hour** or a **Degree.**

Ghaṭikās					Palas.	Ghaṭikās.					Palas.	Ghaṭikās.					Palas.	Ghaṭikās.				
40	**41**	**42**	**43**	**44**		**45**	**46**	**47**	**48**	**49**		**50**	**51**	**52**	**53**	**54**		**55**	**56**	**57**	**58**	**59**
·6667	·6833	·7000	·7167	·7333	**0**	·7500	·7667	·7833	·8000	·8167	**0**	·8333	·8500	·8667	·8833	·9000	**0**	·9167	·9333	·9500	·9667	·9833
·6669	·6836	·7003	·7169	·7336	**1**	·7503	·7669	·7836	·8003	·8169	**1**	·8336	·8503	·8669	·8836	·9003	**1**	·9169	·9336	·9503	·9669	·9836
·6672	·6839	·7006	·7172	·7339	**2**	·7505	·7672	·7839	·8005	·8172	**2**	·8339	·8505	·8672	·8839	·9005	**2**	·9172	·9339	·9505	·9672	·9839
·6675	·6842	·7008	·7175	·7342	**3**	·7508	·7675	·7842	·8008	·8175	**3**	·8342	·8508	·8675	·8842	·9008	**3**	·9175	·9342	·9508	·9675	·9842
·6678	·6844	·7011	·7178	·7344	**4**	·7511	·7678	·7844	·8011	·8178	**4**	·8344	·8511	·8678	·8844	·9011	**4**	·9178	·9344	·9511	·9678	·9844
·6680	·6847	·7014	·7180	·7347	**5**	·7514	·7680	·7847	·8014	·8180	**5**	·8347	·8514	·8680	·8847	·9014	**5**	·9180	·9347	·9514	·9680	·9847
·6683	·6850	·7017	·7183	·7350	**6**	·7517	·7683	·7850	·8017	·8183	**6**	·8350	·8517	·8683	·8850	·9017	**6**	·9183	·9350	·9517	·9683	·9850
·6686	·6853	·7019	·7186	·7353	**7**	·7519	·7686	·7853	·8019	·8186	**7**	·8353	·8519	·8686	·8853	·9019	**7**	·9186	·9353	·9519	·9686	·9853
·6689	·6855	·7022	·7189	·7355	**8**	·7522	·7689	·7855	·8022	·8189	**8**	·8355	·8522	·8689	·8855	·9022	**8**	·9189	·9355	·9522	·9689	·9855
·6692	·6858	·7025	·7192	·7358	**9**	·7525	·7692	·7858	·8025	·8192	**9**	·8358	·8525	·8692	·8858	·9025	**9**	·9192	·9358	·9525	·9692	·9858
·6694	·6861	·7028	·7194	·7361	**10**	·7528	·7694	·7861	·8028	·8194	**10**	·8361	·8528	·8694	·8861	·9028	**10**	·9194	·9361	·9528	·9694	·9861
·6697	·6864	·7030	·7197	·7364	**11**	·7530	·7697	·7864	·8030	·8197	**11**	·8364	·8530	·8697	·8864	·9030	**11**	·9197	·9364	·9530	·9697	·9864
·6700	·6867	·7033	·7200	·7367	**12**	·7533	·7700	·7867	·8033	·8200	**12**	·8367	·8533	·8700	·8867	·9033	**12**	·9200	·9367	·9533	·9700	·9867
·6703	·6869	·7036	·7203	·7369	**13**	·7536	·7703	·7869	·8036	·8203	**13**	·8369	·8536	·8703	·8869	·9036	**13**	·9203	·9369	·9536	·9703	·9869
·6705	·6872	·7039	·7205	·7372	**14**	·7539	·7705	·7872	·8039	·8205	**14**	·8372	·8539	·8705	·8872	·9039	**14**	·9205	·9372	·9539	·9705	·9872
·6708	·6875	·7042	·7208	·7375	**15**	·7542	·7708	·7875	·8042	·8208	**15**	·8375	·8542	·8708	·8875	·9042	**15**	·9208	·9375	·9542	·9708	·9875
·6711	·6878	·7044	·7211	·7378	**16**	·7544	·7711	·7878	·8044	·8211	**16**	·8378	·8544	·8711	·8878	·9044	**16**	·9211	·9378	·9544	·9711	·9878
·6714	·6880	·7047	·7214	·7380	**17**	·7547	·7714	·7880	·8047	·8214	**17**	·8380	·8547	·8714	·8880	·9047	**17**	·9214	·9380	·9547	·9714	·9880
·6717	·6883	·7050	·7217	·7383	**18**	·7550	·7717	·7883	·8050	·8217	**18**	·8383	·8550	·8717	·8883	·9050	**18**	·9217	·9383	·9550	·9717	·9883
·6719	·6886	·7053	·7219	·7386	**19**	·7553	·7719	·7886	·8053	·8219	**19**	·8386	·8553	·8719	·8886	·9053	**19**	·9219	·9386	·9553	·9719	·9886
·6722	·6889	·7055	·7222	·7389	**20**	·7555	·7722	·7889	·8055	·8222	**20**	·8389	·8555	·8722	·8889	·9055	**20**	·9222	·9389	·9555	·9722	·9889
·6725	·6892	·7058	·7225	·7392	**21**	·7558	·7725	·7892	·8058	·8225	**21**	·8392	·8558	·8725	·8892	·9058	**21**	·9225	·9392	·9558	·9725	·9892
·6728	·6894	·7061	·7228	·7394	**22**	·7561	·7728	·7894	·8061	·8228	**22**	·8394	·8561	·8728	·8894	·9061	**22**	·9228	·9394	·9561	·9728	·9894
·6730	·6897	·7064	·7230	·7397	**23**	·7564	·7730	·7897	·8064	·8230	**23**	·8397	·8564	·8730	·8897	·9064	**23**	·9230	·9397	·9564	·9730	·9897
·6733	·6900	·7067	·7233	·7400	**24**	·7567	·7733	·7900	·8067	·8233	**24**	·8400	·8567	·8733	·8900	·9067	**24**	·9233	·9400	·9567	·9733	·9900
·6736	·6903	·7069	·7236	·7403	**25**	·7569	·7736	·7903	·8069	·8236	**25**	·8403	·8569	·8736	·8903	·9069	**25**	·9236	·9403	·9569	·9736	·9903
·6739	·6905	·7072	·7239	·7405	**26**	·7572	·7739	·7905	·8072	·8239	**26**	·8405	·8572	·8739	·8905	·9072	**26**	·9239	·9405	·9572	·9739	·9905
·6742	·6908	·7075	·7242	·7408	**27**	·7575	·7742	·7908	·8075	·8242	**27**	·8408	·8575	·8742	·8908	·9075	**27**	·9242	·9408	·9575	·9742	·9908
·6744	·6911	·7078	·7244	·7411	**28**	·7578	·7744	·7911	·8078	·8244	**28**	·8411	·8578	·8744	·8911	·9078	**28**	·9244	·9411	·9578	·9744	·9911
·6747	·6914	·7080	·7247	·7414	**29**	·7580	·7747	·7914	·8080	·8647	**29**	·8414	·8580	·8747	·8914	·9080	**29**	·9247	·9414	·9580	·9747	·9914
·6750	·6917	·7083	·7250	·7417	**30**	·7583	·7750	·7917	·8083	·8250	**30**	·8417	·8583	·8750	·8917	·9083	**30**	·9250	·9417	·9583	·9750	·9917
·6753	·6919	·7086	·7253	·7419	**31**	·7586	·7753	·7919	·8086	·8253	**31**	·8419	·8586	·8753	·8919	·9086	**31**	·9253	·9419	·9586	·9753	·9919
·6755	·6922	·7089	·7255	·7422	**32**	·7589	·7755	·7922	·8089	·8255	**32**	·8422	·8589	·8755	·8922	·9089	**32**	·9255	·9422	·9589	·9755	·9922
·6758	·6925	·7092	·7258	·7425	**33**	·7592	·7758	·7925	·8092	·8258	**33**	·8425	·8592	·8758	·8925	·9092	**33**	·9258	·9425	·9592	·9758	·9925
·6761	·6928	·7094	·7261	·7428	**34**	·7594	·7761	·7928	·8094	·8261	**34**	·8428	·8594	·8761	·8928	·9094	**34**	·9261	·9428	·9594	·9761	·9928
·6764	·6930	·7097	·7264	·7430	**35**	·7597	·7764	·7930	·8097	·8264	**35**	·8430	·8597	·8764	·8930	·9097	**35**	·9264	·9430	·9597	·9764	·9930
·6767	·6933	·7100	·7267	·7433	**36**	·7600	·7767	·7933	·8100	·8267	**36**	·8433	·8600	·8767	·8933	·9100	**36**	·9267	·9433	·9600	·9767	·9933
·6769	·6936	·7103	·7269	·7436	**37**	·7603	·7769	·7936	·8103	·8269	**37**	·8436	·8603	·8769	·8936	·9103	**37**	·9269	·9436	·9603	·9769	·9936
·6772	·6939	·7105	·7272	·7439	**38**	·7605	·7772	·7939	·8105	·8272	**38**	·8439	·8605	·8772	·8939	·9105	**38**	·9272	·9439	·9605	·9772	·9939
·6775	·6942	·7108	·7275	·7442	**39**	·7608	·7775	·7942	·8108	·8275	**39**	·8442	·8608	·8775	·8942	·9108	**39**	·9275	·9442	·9608	·9775	·9942
·6778	·6944	·7111	·7278	·7444	**40**	·7611	·7778	·7944	·8111	·8278	**40**	·8444	·8611	·8778	·8944	·9111	**40**	·9278	·9444	·9611	·9778	·9944
·6780	·6947	·7114	·7280	·7447	**41**	·7614	·7780	·7947	·8114	·8280	**41**	·8447	·8614	·8780	·8947	·9114	**41**	·9280	·9447	·9614	·9780	·9947
·6783	·6950	·7117	·7283	·7450	**42**	·7617	·7783	·7950	·8117	·8283	**42**	·8450	·8617	·8783	·8950	·9117	**42**	·9283	·9450	·9617	·9783	·9950
·6786	·6953	·7119	·7286	·7453	**43**	·7619	·7786	·7953	·8119	·8286	**43**	·8453	·8619	·8786	·8953	·9119	**43**	·9286	·9453	·9619	·9786	·9953
·6789	·6955	·7122	·7289	·7455	**44**	·7622	·7789	·7955	·8122	·8289	**44**	·8455	·8622	·8789	·8955	·9122	**44**	·9289	·9455	·9622	·9789	·9955
·6792	·6958	·7125	·7292	·7458	**45**	·7625	·7792	·7958	·8125	·8292	**45**	·8458	·8625	·8792	·8958	·9125	**45**	·9292	·9458	·9625	·9792	·9958
·6794	·6961	·7128	·7294	·7461	**46**	·7628	·7794	·7961	·8128	·8294	**46**	·8161	·8628	·8794	·8961	·9128	**46**	·9294	·9461	·9628	·9794	·9961
·6797	·6964	·7130	·7297	·7464	**47**	·7630	·7797	·7964	·8130	·8297	**47**	·8464	·8630	·8797	·8964	·9130	**47**	·9297	·9164	·9630	·9797	·9964
·6800	·6967	·7133	·7300	·7467	**48**	·7633	·7800	·7967	·8133	·8300	**48**	·8467	·8633	·8800	·8967	·9133	**48**	·9300	·9467	·9633	·9800	·9967
·6803	·6969	·7136	·7303	·7469	**49**	·7636	·7803	·7969	·8136	·8303	**49**	·8469	·8636	·8803	·8969	·9136	**49**	·9303	·9469	·9636	·9803	·9969
·6805	·6972	·7139	·7305	·7472	**50**	·7639	·7805	·7972	·8139	·8305	**50**	·8472	·8639	·8805	·8972	·9139	**50**	·9305	·9472	·9639	·9805	·9972
·6808	·6975	·7142	·7308	·7475	**51**	·7642	·7808	·7975	·8142	·8308	**51**	·8475	·8642	·8808	·8975	·9142	**51**	·9308	·9475	·9642	·9808	·9975
·6811	·6978	·7144	·7311	·7478	**52**	·7644	·7811	·7978	·8144	·8311	**52**	·8478	·8644	·8811	·8978	·9144	**52**	·9311	·9478	·9644	·9811	·9978
·6814	·6980	·7147	·7314	·7480	**53**	·7647	·7814	·7980	·8147	·8314	**53**	·8480	·8647	·8814	·8980	·9147	**53**	·9314	·9480	·9647	·9814	·9980
·6817	·6983	·7150	·7317	·7483	**54**	·7650	·7817	·7983	·8150	·8317	**54**	·8483	·8650	·8817	·8983	·9150	**54**	·9317	·9483	·9650	·9817	·9983
·6819	·6986	·7153	·7319	·7486	**55**	·7653	·7819	·7986	·8153	·8319	**55**	·8486	·8653	·8819	·8986	·9153	**55**	·9319	·9486	·9653	·9819	·9986
·6822	·6989	·7155	·7322	·7489	**56**	·7655	·7822	·7989	·8155	·8322	**56**	·8489	·8655	·8822	·8989	·9155	**56**	·9322	·9489	·9655	·9822	·9989
·6825	·6992	·7158	·7325	·7492	**57**	·7658	·7825	·7992	·8158	·8325	**57**	·8492	·8658	·8825	·8992	·9158	**57**	·9325	·9492	·9658	·9825	·9992
·6828	·6994	·7161	·7328	·7494	**58**	·7661	·7828	·7994	·8161	·8328	**58**	·8494	·8661	·8828	·8994	·9161	**58**	·9328	·9494	·9661	·9828	·9994
·6830	·6997	·7164	·7330	·7497	**59**	·7664	·7830	·7997	·8164	·8330	**59**	·8497	·8664	·8830	·8997	·9163	**59**	·9330	·9497	·9664	·9830	·9997

TABLE VI—cont.

Hours and Minutes as Fractions of a Day—cont.

Minutes	Hours				Minutes	Hours				Minutes	Hours				Minutes	Seconds of hours as fractions of a day.
	0	1	2	3		4	5	6	7		8	9	10	11		
0	·0000000	·0416666	·0833333	·1250000	**0**	·1666666	·2083333	·2500000	·2916666	**0**	·3333333	·3750000	·4166666	·4583333	**0**	·00000
1	·0006944	·0423611	·0840277	·1256944	**1**	·1673611	·2090277	·2506944	·2923611	**1**	·3340277	·3756944	·4173611	·4590277	**1**	·00001
2	·0013888	·0430555	·0847222	·1263888	**2**	·1680555	·2097222	·2513888	·2930555	**2**	·3347222	·3763888	·4180555	·4597222	**2**	·00002
3	·0020833	·0437500	·0854166	·1270833	**3**	·1687500	·2104166	·2520833	·2937500	**3**	·3354166	·3770833	·4187500	·4604166	**3**	·00003
4	·0027777	·0444444	·0861111	·1277777	**4**	·1694444	·2111111	·2527777	·2944444	**4**	·3361111	·3777777	·4194444	·4611111	**4**	·00005
5	·0034722	·0451388	·0868055	·1284722	**5**	·1701388	·2118055	·2534722	·2951388	**5**	·3368055	·3784722	·4201388	·4618055	**5**	·00006
6	·0041666	·0458333	·0875000	·1291666	**6**	·1708333	·2125000	·2541666	·2958333	**6**	·3375000	·3791666	·4208333	·4625000	**6**	·00007
7	·0048611	·0465277	·0881944	·1298611	**7**	·1715277	·2131944	·2548611	·2965277	**7**	·3381944	·3798611	·4215277	·4631944	**7**	·00008
8	·0055555	·0472222	·0888888	·1305555	**8**	·1722222	·2138888	·2555555	·2972222	**8**	·3388888	·3805555	·4222222	·4638888	**8**	·00009
9	·0062500	·0479166	·0895833	·1312500	**9**	·1729166	·2145833	·2562500	·2979166	**9**	·3395833	·3812500	·4229166	·4645833	**9**	·00010
10	·0069444	·0486111	·0902777	·1319444	**10**	·1736111	·2152777	·2569444	·2986111	**10**	·3402777	·3819444	·4236111	·4652777	**10**	·00012
11	·0076388	·0493055	·0909722	·1326388	**11**	·1743055	·2159722	·2576388	·2993055	**11**	·3409722	·3826388	·4243055	·4659722	**11**	·00013
12	·0083333	·0500000	·0916666	·1333333	**12**	·1750000	·2166666	·2583333	·3000000	**12**	·3416666	·3833333	·4250000	·4666666	**12**	·00014
13	·0090277	·0506944	·0923611	·1340277	**13**	·1756944	·2173611	·2590277	·3006944	**13**	·3423611	·3840277	·4256944	·4673611	**13**	·00015
14	·0097222	·0513888	·0930555	·1347222	**14**	·1763888	·2180555	·2597222	·3013888	**14**	·3430555	·3847222	·4263888	·4680555	**14**	·00016
15	·0104166	·0520833	·0937500	·1354166	**15**	·1770833	·2187500	·2604166	·3020833	**15**	·3437500	·3854166	·4270833	·4687500	**15**	·00017
16	·0111111	·0527777	·0944444	·1361111	**16**	·1777777	·2194444	·2611111	·3027777	**16**	·3444444	·3861111	·4277777	·4694444	**16**	·00018
17	·0118055	·0534722	·0951388	·1368055	**17**	·1784722	·2201388	·2618055	·3034722	**17**	·3451388	·3868055	·4284722	·4701388	**17**	·00020
18	·0125000	·0541666	·0958333	·1375000	**18**	·1791666	·2208333	·2625000	·3041666	**18**	·3458333	·3875000	·4291666	·4708333	**18**	·00021
19	·0131944	·0548611	·0965277	·1381944	**19**	·1798611	·2215277	·2631944	·3048611	**19**	·3465277	·3881944	·4298611	·4715277	**19**	·00022
20	·0138888	·0555555	·0972222	·1388888	**20**	·1805555	·2222222	·2638888	·3055555	**20**	·3472222	·3888888	·4305555	·4722222	**20**	·00023
21	·0145833	·0562500	·0979166	·1395833	**21**	·1812500	·2229166	·2645833	·3062500	**21**	·3479166	·3895833	·4312500	·4729166	**21**	·00024
22	·0152777	·0569444	·0986111	·1402777	**22**	·1819444	·2236111	·2652777	·3069444	**22**	·3486111	·3902777	·4319444	·4736111	**22**	·00025
23	·0159722	·0576388	·0993055	·1409722	**23**	·1826388	·2243055	·2659722	·3076388	**23**	·3493055	·3909722	·4326388	·4743055	**23**	·00027
24	·0166666	·0583333	·1000000	·1416666	**24**	·1833333	·2350000	·2666666	·3083333	**24**	·3500000	·3916666	·4333333	·4750000	**24**	·00028
25	·0173611	·0590277	·1006944	·1423611	**25**	·1840277	·2256944	·2673611	·3090277	**25**	·3506944	·3923611	·4340277	·4756944	**25**	·00029
26	·0180555	·0597222	·1013888	·1430555	**26**	·1847222	·2263888	·2680555	·3097222	**26**	·3513888	·3930555	·4347222	·4763888	**26**	·00030
27	·0187500	·0604166	·1020833	·1437500	**27**	·1854166	·2270833	·2687500	·3104166	**27**	·3520833	·3937500	·4354166	·4770833	**27**	·00031
28	·0194444	·0611111	·1027777	·1444444	**28**	·1861111	·2277777	·2694444	·3111111	**28**	·3527777	·3944444	·4361111	·4777777	**28**	·00032
29	·0201388	·0618055	·1034722	·1451388	**29**	·1868055	·2284722	·2701388	·3118055	**29**	·3534722	·3951388	·4368055	·4784722	**29**	·00034
30	·0208333	·0625000	·1041666	·1458333	**30**	·1875000	·2291666	·2708333	·3125000	**30**	·3541666	·3958333	·4375000	·4791666	**30**	·00035
31	·0215277	·0631944	·1048611	·1465277	**31**	·1881944	·2298611	·2715277	·3131944	**31**	·3548611	·3965277	·4381944	·4798611	**31**	·00036
32	·0222222	·0638888	·1055555	·1472222	**32**	·1888888	·2305555	·2722222	·3138888	**32**	·3555555	·3972222	·4388888	·4805555	**32**	·00037
33	·0229166	·0645833	·1062500	·1479166	**33**	·1895833	·2312500	·2729166	·3145833	**33**	·3562500	·3979166	·4395833	·4812500	**33**	·00038
34	·0236111	·0652777	·1069444	·1486111	**34**	·1902777	·2319444	·2736111	·3152777	**34**	·3569444	·3986111	·4402777	·4819444	**34**	·00039
35	·0243055	·0659722	·1076388	·1493055	**35**	·1909722	·2326388	·2743055	·3159722	**35**	·3576388	·3993055	·4409722	·4826388	**35**	·00040
36	·0250000	·0666666	·1083333	·1500000	**36**	·1916666	·2333333	·2750000	·3166666	**36**	·3583333	·4000000	·4416666	·4833333	**36**	·00042
37	·0256944	·0673611	·1090277	·1506944	**37**	·1923611	·2340277	·2756944	·3173611	**37**	·3590277	·4006944	·4423611	·4840277	**37**	·00043
38	·0263888	·0680555	·1097222	·1513888	**38**	·1930555	·2347222	·2763888	·3180555	**38**	·3597222	·4013888	·4430555	·4847222	**38**	·00044
39	·0270833	·0687500	·1104166	·1520833	**39**	·1937500	·2354166	·2770833	·3187500	**39**	·3604166	·4020833	·4437500	·4854166	**39**	·00045
40	·0277777	·0694444	·1111111	·1527777	**40**	·1944444	·2361111	·2777777	·3194444	**40**	·3611111	·4027777	·4444444	·4861111	**40**	·00046
41	·0284722	·0701388	·1118055	·1534722	**41**	·1951388	·2368055	·2784722	·3201388	**41**	·3618055	·4034722	·4451388	·4868055	**41**	·00047
42	·0291666	·0708333	·1125000	·1541666	**42**	·1958333	·2375000	·2791666	·3208333	**42**	·3625000	·4041666	·4458333	·4875000	**42**	·00049
43	·0298611	·0715277	·1131944	·1548611	**43**	·1965277	·2381944	·2798611	·3215277	**43**	·3631944	·4048611	·4465277	·4881944	**43**	·00050
44	·0305555	·0722222	·1138888	·1555555	**44**	·1972222	·2388888	·2805555	·3222222	**44**	·3638888	·4055555	·4472222	·4888888	**44**	·00051
45	·0312500	·0729166	·1145833	·1562500	**45**	·1979166	·2395833	·2812500	·3229166	**45**	·3645833	·4062500	·4479166	·4895833	**45**	·00052
46	·0319444	·0736111	·1152777	·1569444	**46**	·1986111	·2402777	·2819444	·3236111	**46**	·3652777	·4069444	·4486111	·4902777	**46**	·00053
47	·0326388	·0743055	·1159722	·1576388	**47**	·1993055	·2409722	·2826388	·3243055	**47**	·3659722	·4076388	·4493055	·4909722	**47**	·00054
48	·0333333	·0750000	·1166666	·1583333	**48**	·2000000	·2416666	·2833333	·3250000	**48**	·3666666	·4083333	·4500000	·4916666	**48**	·00055
49	·0340277	·0756944	·1173611	·1590277	**49**	·2006944	·2423611	·2840277	·3256944	**49**	·3673611	·4090277	·4506944	·4923611	**49**	·00057
50	·0347222	·0763888	·1180555	·1597222	**50**	·2013888	·2430555	·2847222	·3263888	**50**	·3680555	·4097222	·4513888	·4930555	**50**	·00058
51	·0354166	·0770833	·1187500	·1604166	**51**	·2020833	·2437500	·2854166	·3270833	**51**	·3687500	·4104166	·4520833	·4937500	**51**	·00059
52	·0361111	·0777777	·1194444	·1611111	**52**	·2027777	·2444444	·2861111	·3277777	**52**	·3694444	·4111111	·4527777	·4944444	**52**	·00060
53	·0368055	·0784722	·1201388	·1618055	**53**	·2034722	·2451388	·2868055	·3284722	**53**	·3701388	·4118055	·4534722	·4951388	**53**	·00061
54	·0375000	·0791666	·1208333	·1625000	**54**	·2041666	·2458333	·2875000	·3291666	**54**	·3708333	·4125000	·4541666	·4958333	**54**	·00062
55	·0381944	·0798611	·1215277	·1631944	**55**	·2048611	·2465277	·2881944	·3298611	**55**	·3715277	·4131944	·4548611	·4965277	**55**	·00064
56	·0388888	·0805555	·1222222	·1638888	**56**	·2055555	·2472222	·2888888	·3305555	**56**	·3722222	·4138888	·4555555	·4972222	**56**	·00065
57	·0395833	·0812500	·1229166	·1645833	**57**	·2062500	·2479166	·2895833	·3312500	**57**	·3729166	·4145833	·4562500	·4979166	**57**	·00066
58	·0402777	·0819444	·1236111	·1652777	**58**	·2069444	·2486111	·2202777	·3319444	**58**	·3736111	·4152777	·4569444	·4986111	**58**	·00067
59	·0409722	·0826388	·1243055	·1659722	**59**	·2076388	·2493055	·2909722	·3326388	**59**	·3743055	·4159722	·4576388	·4993055	**59**	·00068

TABLE VI—*cont.*

Hours and Minutes as Fractions of a Day—*cont.*

	Hours.				Minutes.	Hours.				Minutes.	Hours.				Minutes.	Seconds of hours as fractions of a day.
	12	**13**	**14**	**15**		**16**	**17**	**18**	**19**		**20**	**21**	**22**	**23**		
0	·5000000	·5416666	·5833333	·6250000	**0**	·6666666	·7083333	·7500000	·7916666	**0**	·8333333	·8750000	·9166666	·9583333	**0**	·00000
1	·5006944	·5423611	·5840277	·6256944	**1**	·6673611	·7090277	·7506944	·7923611	**1**	·8340277	·8756944	·9173611	·9590277	**1**	·00001
2	·5013888	·5430555	·5847222	·6263888	**2**	·6680555	·7097222	·7513888	·7930555	**2**	·8347222	·8763888	·9180555	·9597222	**2**	·00002
3	·5020833	·5437500	·5854166	·6270833	**3**	·6687500	·7104166	·7520833	·7937500	**3**	·8354166	·8770833	·9187500	·9604166	**3**	·00003
4	·5027777	·5444444	·5861111	·6277777	**4**	·6694444	·7111111	·7527777	·7944444	**4**	·8361111	·8777777	·9194444	·9611111	**4**	·00005
5	·5034722	·5451388	·5868055	·6284722	**5**	·6701388	·7118055	·7534722	·7951388	**5**	·8368055	·8784722	·9201388	·9618055	**5**	·00006
6	·5041666	·5458333	·5875000	·6291666	**6**	·6708333	·7125000	·7541666	·7958333	**6**	·8375000	·8791666	·9208333	·9625000	**6**	·00007
7	·5048611	·5465277	·5881944	·6298611	**7**	·6715277	·7131944	·7548611	·7965277	**7**	·8381944	·8798611	·9215277	·9631944	**7**	·00008
8	·5055555	·5472222	·5888888	·6305555	**8**	·6722222	·7138888	·7555555	·7972222	**8**	·8388888	·8805555	·9222222	·9638888	**8**	·00009
9	·5062500	·5479166	·5895833	·6312500	**9**	·6729166	·7145833	·7562500	·7979166	**9**	·8395833	·8812500	·9229166	·9645833	**9**	·00010
10	·5069444	·5486111	·5902777	·6319444	**10**	·6736111	·7152777	·7569444	·7986111	**10**	·8402777	·8819444	·9236111	·9652777	**10**	·00012
11	·5076388	·5493055	·5909722	·6326388	**11**	·6743055	·7159722	·7576388	·7993055	**11**	·8409722	·8826388	·9243055	·9659722	**11**	·00013
12	·5083333	·5500000	·5916666	·6333333	**12**	·6750000	·7166666	·7583333	·8000000	**12**	·8416666	·8833333	·9250000	·9666666	**12**	·00014
13	·5090277	·5506944	·5923611	·6340277	**13**	·6756944	·7173611	·7590277	·8006944	**13**	·8423611	·8840277	·9256944	·9673611	**13**	·00015
14	·5097222	·5513888	·5930555	·6347222	**14**	·6763888	·7180555	·7597222	·8013888	**14**	·8430555	·8847222	·9263888	·9680555	**14**	·00016
15	·5104166	·5520833	·5937500	·6354166	**15**	·6770833	·7187500	·7604166	·8020833	**15**	·8437500	·8854166	·9270833	·9687500	**15**	·00017
16	·5111111	·5527777	·5944444	·6361111	**16**	·6777777	·7194444	·7611111	·8027777	**16**	·8444444	·8861111	·9277777	·9694444	**16**	·00018
17	·5118055	·5534722	·5951388	·6368055	**17**	·6784722	·7201388	·7618055	·8034722	**17**	·8451388	·8868055	·9284722	·9701388	**17**	·00020
18	·5125000	·5541666	·5958333	·6375000	**18**	·6791666	·7208333	·7625000	·8041666	**18**	·8458333	·8875000	·9291666	·9708333	**18**	·00021
19	·5131944	·5548611	·5965277	·6381944	**19**	·6798611	·7215277	·7631944	·8048611	**19**	·8465277	·8881944	·9298611	·9715277	**19**	·00022
20	·5138888	·5555555	·5972222	·6388888	**20**	·6805555	·7222222	·7638888	·8055555	**20**	·8472222	·8888888	·9305555	·9722222	**20**	·00023
21	·5145833	·5562500	·5979166	·6395833	**21**	·6812500	·7229166	·7645833	·8062500	**21**	·8479166	·8895833	·9312500	·9729166	**21**	·00024
22	·5152777	·5569444	·5986111	·6402777	**22**	·6819444	·7236111	·7652777	·8069444	**22**	·8486111	·8902777	·9319444	·9736111	**22**	·00025
23	·5159722	·5576388	·5993055	·6409722	**23**	·6826388	·7243055	·7659722	·8076388	**23**	·8493055	·8909722	·9326388	·9743055	**23**	·00027
24	·5166666	·5583333	·6000000	·6416666	**24**	·6833333	·7250000	·7666666	·8083333	**24**	·8500000	·8916666	·9333333	·9750000	**24**	·00028
25	·5173611	·5590277	·6006944	·6423611	**25**	·6840277	·7256944	·7673611	·8090277	**25**	·8506944	·8923611	·9340277	·9756944	**25**	·00029
26	·5180555	·5597222	·6013888	·6430555	**26**	·6847222	·7263888	·7680555	·8097222	**26**	·8513888	·8930555	·9347222	·9763888	**26**	·00030
27	·5187500	·5604166	·6020833	·6437500	**27**	·6854166	·7270833	·7687500	·8104166	**27**	·8520833	·8937500	·9354166	·9770833	**27**	·00031
28	·5194444	·5611111	·6027777	·6444444	**28**	·6861111	·7277777	·7694444	·8111111	**28**	·8527777	·8944444	·9361111	·9777777	**28**	·00032
29	·5201388	·5618055	·6034722	·6451388	**29**	·6868055	·7284722	·7701388	·8118055	**29**	·8534722	·8951388	·9368055	·9784722	**29**	·00034
30	·5208333	·5625000	·6041666	·6458333	**30**	·6875000	·7291666	·7708333	·8125000	**30**	·8541666	·8958333	·9375000	·9791666	**30**	·00035
31	·5215277	·5631944	·6048611	·6465277	**31**	·6881944	·7298611	·7715277	·8131944	**31**	·8548611	·8965277	·9381944	·9798611	**31**	·00036
32	·5222222	·5638888	·6055555	·6472222	**32**	·6888888	·7305555	·7722222	·8138888	**32**	·8555555	·8972222	·9388888	·9805555	**32**	·00037
33	·5229166	·5645833	·6062500	·6479166	**33**	·6895833	·7312500	·7729166	·8145833	**33**	·8562500	·8979166	·9395833	·9812500	**33**	·00038
34	·5236111	·5652777	·6069444	·6486111	**34**	·6902777	·7319444	·7736111	·8152777	**34**	·8569444	·8986111	·9402777	·9819444	**34**	·00039
35	·5243055	·5659722	·6076388	·6493055	**35**	·6909722	·7326388	·7743055	·8159722	**35**	·8576388	·8993055	·9409722	·9826388	**35**	·00040
36	·5250000	·5666666	·6083333	·6500000	**36**	·6916666	·7333333	·7750000	·8166666	**36**	·8583333	·9000000	·9416666	·9833333	**36**	·00042
37	·5256944	·5673611	·6090277	·6506944	**37**	·6923611	·7340277	·7756944	·8173611	**37**	·8590277	·9006944	·9423611	·9840277	**37**	·00043
38	·5263888	·5680555	·6097222	·6513888	**38**	·6930555	·7347222	·7763888	·8180555	**38**	·8597222	·9013888	·9430555	·9847222	**38**	·00044
39	·5270833	·5687500	·6104166	·6520833	**39**	·6937500	·7354166	·7770833	·8187500	**39**	·8604166	·9020833	·9437500	·9854166	**39**	·00045
40	·5277777	·5694444	·6111111	·6527777	**40**	·6944444	·7361111	·7777777	·8194444	**40**	·8611111	·9027777	·9444444	·9861111	**40**	·00046
41	·5284722	·5701388	·6118055	·6534722	**41**	·6951388	·7368055	·7784722	·8201388	**41**	·8618055	·9034722	·9451388	·9868055	**41**	·00047
42	·5291666	·5708333	·6125000	·6541666	**42**	·6958333	·7375000	·7791666	·8208333	**42**	·8625000	·9041666	·9458333	·9875000	**42**	·00049
43	·5298611	·5715277	·6131944	·6548611	**43**	·6965277	·7381944	·7798611	·8215277	**43**	·8631944	·9048611	·9465277	·9881944	**43**	·00050
44	·5305555	·5722222	·6138888	·6555555	**44**	·6972222	·7388888	·7805555	·8222222	**44**	·8638888	·9055555	·9472222	·9888888	**44**	·00051
45	·5312500	·5729166	·6145833	·6562500	**45**	·6979166	·7395833	·7812500	·8229166	**45**	·8645833	·9062500	·9479166	·9895833	**45**	·00052
46	·5319444	·5736111	·6152777	·6569444	**46**	·6986111	·7402777	·7819444	·8236111	**46**	·8652777	·9069444	·9486111	·9902777	**46**	·00053
47	·5326388	·5743055	·6159722	·6576388	**47**	·6993055	·7409722	·7826388	·8243055	**47**	·8659722	·9076388	·9493055	·9909722	**47**	·00054
48	·5333333	·5750000	·6166666	·6583333	**48**	·7000000	·7416666	·7833333	·8250000	**48**	·8666666	·9083333	·9500000	·9916666	**48**	·00055
49	·5340277	·5756944	·6173611	·6590277	**49**	·7006944	·7423611	·7840277	·8256944	**49**	·8673611	·9090277	·9506944	·9923611	**49**	·00057
50	·5347222	·5763888	·6180555	·6597222	**50**	·7013888	·7430555	·7847222	·8263888	**50**	·8680555	·9097222	·9513888	·9930555	**50**	·00058
51	·5354166	·5770833	·6187500	·6604166	**51**	·7020833	·7437500	·7854166	·8270833	**51**	·8687500	·9104166	·9520833	·9937500	**51**	·00059
52	·5361111	·5777777	·6194444	·6611111	**52**	·7027777	·7444444	·7861111	·8277777	**52**	·8694444	·9111111	·9527777	·9944444	**52**	·00060
53	·5368055	·5784722	·6201388	·6618055	**53**	·7034722	·7451388	·7868055	·8284722	**53**	·8701388	·9118055	·9534722	·9951388	**53**	·00061
54	·5375000	·5791666	·6208333	·6625000	**54**	·7041666	·7458333	·7875000	·8291666	**54**	·8708333	·9125000	·9541666	·9958333	**54**	·00062
55	·5381944	·5798611	·6215277	·6631944	**55**	·7048611	·7465277	·7881944	·8298611	**55**	·8715277	·9131944	·9548611	·9965277	**55**	·00064
56	·5388888	·5805555	·6222222	·6638888	**56**	·7055555	·7472222	·7888888	·8305555	**56**	·8722222	·9138888	·9555555	·9972222	**56**	·00065
57	·5395833	·5812500	·6229166	·6645833	**57**	·7062500	·7479166	·7895833	·8312500	**57**	·8729166	·9145833	·9562500	·9979166	**57**	·00066
58	·5402777	·5819444	·6236111	·6652777	**58**	·7069444	·7486111	·7902777	·8319444	**58**	·8736111	·9152777	·9569444	·9986111	**58**	·00067
59	·5409722	·5826388	·6243055	·6659722	**59**	·7076388	·7493055	·7909722	·8326388	**59**	·8743055	·9159722	·9576388	·9993055	**59**	·00068

APPENDIX (i)

THE VEDĀṄGA JYOTISHA CALENDAR.

(The substance of Sir S. Subrahmanyam Lectures delivered by the author for the Madras University in March 1916.)

Varāhamihira, to whom we owe largely the beginnings of modern Indian astronomy as well as of modern Indian astrology, says in *Bṛhat Samhita*, 3, 2 :—

> āśleshārdhāt dakshinam, uttaram ayanam raveh dhanishthādyam
> nūnam kadācit āsīt : yenoktam pūrvaśāstreshu
> sāmpratam ayanam savituh karkaṭakādyam mṛgāditascanyat ;
> uktā bhāvo vikṛitih ; pratyaksha parikshaṇaih vyaktih.

Translation.

" The southward journey of the sun is from the half of Asleshā ; his northward journey is from the beginning of Dhanishṭhā: it was so at one time as stated in old treatises : now the dakshināyana is from the beginning of Karkaṭaka and the other ayana is from the beginning of Makara, as may be plainly seen by the eye "

and in *Panchasiddhāntika* (translated by Dr. Thibaut and by Bāpu Devaśāstri), to the same effect :—

> āśleshārdhāt āsīt yadā nivṛittih kiloshṇakiraṇasya ;
> yuktam ayanam tadāsīt : sāmpratam ayanam punarvasutah :

In these two passages Varāhamihira states that at one time Dakhināyana, or the summer solstice, took place when the sun was in the middle of Āślesha nakshatra, and Uttarāyana or the winter solstice when the sun was at the beginning of Dhanishṭhā nakshatra, whereas in Varāhamihira's own time, the Dakshināyana, " as any one may see, " so he says, occurred when the sun was in the beginning of Karkaṭaka rāśi or Punarvasu nakshatra. Nevertheless, he says, the previous observations, recorded by ancient writers, were correct for *their* time : *yuktamayanam tadāsīt.*

2. The ancient observation referred to by Varāhamihira is obviously that recorded in the Vedāṅga Jyotisha, which, as we shall presently see, was just as ancient to Varāhamihira as Varāhamihira is to us ; in other words Varāhamihira's work stands at the centre of a period of astronomy whose span is 3,000 years, at one end of which we stand and at the other end the Vedāṅga Jyotisha.

Description of the Vedāṅga Jyotisha.—The Vedāṅga Jyotisha, a set of rules for ascertaining the year, month and day and fraction of a day, is well known to Indian teachers and students of the Veda who learn and recite it as part of the Veda It is obscure as to a good deal of its contents, and has not been translated into English, but it was edited by Weber,—see paragraph 4 below,—and practically the whole of it (about 35 slokas, with omissions) is given in Dikshit's *History of Indian Astronomy* (in Mahrātti). Nevertheless, no one has endeavoured to construct or reconstruct the Vedāṅga Jyotisha system as a connected and consistent whole, just in the way, for instance, in which we are now able to construct the Sūrya Siddhānta scheme of years, months and days for any period to which that system might be applied, currently, retrospectively or prospectively.

3. Before Varāhamihira's time, only two methods of dividing the ecliptic were known to, and practised by, Indian astronomers. These methods were, first by the *ritus* or six seasons of the year, and secondly by the *nakshatras* or lunar mansions, of which 27 (sometimes 28) are, as is well known reckoned in the Indian calendar. The nakshatras are a natural division of the ecliptic, because each of them, measuring $\frac{360}{27}$ degrees = $13\frac{1}{3}$ degrees, is the space travelled by the

moon along the stars in the course of a single day and night, so that a nakshatra is practically equal in length of time to a day and a night—see paragraph 27, page 7 of the text.

4. The chief works of reference on the subject of the nakshatras are Weber's two treatises in German (*Die Vedischen Nachrichten von den Nakshatra,* and *Ueber den Veda Kalender namens Jyotisha*), published respectively in 1860 and 1862, which do not appear to have been translated into English. Dr. Thibaut's monograph on *Mathematics, Astronomy and Astrology* in the German *Encyclopaedia of Indo-Aryan Research,* and the late Śankara Bālakrishna Dīkshit's *Bhāratīya Jyotishśastra* or "History of Indian Astronomy" (published in Mahratti in 1896) are two other important works, dealing with nakshatras, which may be mentioned in this connexion as still awaiting translation into English. In *Macdonnell and Keith's Vedic Index,* however, there are very good summaries in English of nearly all that is known at present about the ancient observations of nakshatras in vedic times.

5. *The Yuga of five years.*—We have information from two or three ancient sources on the subject of the synodical system of the Vedāṅga Jyotisha. All of it comes to this, that once in a yuga of 5 years the sun and moon must return to the same position that they occupied at the beginning of the yuga, and that position is the beginning of nakshatra *Dhanishthā* and Māgha śukḷa 1.

6. *Difference between the sidereal and the tropical year.*—We have to study with some care the meaning of the expressions "a year" and "5 years" in this definition of a yuga. In the Vedāṅga Jyotisha period, the Hindus seem to have been acquainted with only one kind of year, viz., the tropical. The tropical year is not a difficult kind of year for *us* to understand, since the European year which we all observe, is a nearly perfect tropical year. "Tropical year" means the kind of year which brings back the same seasons after the same number of days. At present the summer solstice, when the sun reaches his extreme limit in his northern course, falls on June 22; and we know that on June 22 we in India may expect rain every year and with the rain cultivation begins. Similarly, on December 22, when the sun is in the winter solstice or at his southernmost limit, we know that it is the coldest part of the year, and every year we expect the cold weather to return at that time and we are not disappointed.

7. Now, we have in use in the Tamil country another kind of year, that is, one which begins at present on April 13 or 14, but which 50 years ago used to begin on April 11; and which 5000 years ago, if any reckoning had been then kept, would have begun on 15 February (3102 B.C.) page 2, paragraph 4 of text. This year which at present imperceptibly gets away further and further from the tropical year, is called a sidereal year, and its initial day moves so slowly because every year the difference between it and the tropical year is only a few minutes of time; about a ghaṭika. (See paper No. ii in this appendix — *On luni-solar precession in Indian Astronomy.*) It naturally takes a long time for this difference to amount to a month or to two months.

8. Naturally, also, it took a long time for the ancient Hindus to understand the practical difference between the two kinds of years, and if we wish to enter into the details of ancient Indian chronology, it is necessary that we should realize clearly the consequences of the confusion in their minds. When Varāhamihira says that in his time the return of the sun was from Punarvasu nakshatra or from Karkaṭaka rāśi, whereas of old the sun returned from the half of Āślesha nakshatra, and that this ancient observation was correct at that epoch, he gives us in fact a first glimpse of the effect of the precession of equinoxes, a phenomenon, however, as to which he himself was entirely in the dark.

9. At present Dakshināyana, or the summer solstice, falls on June 22, and according to Table IV-C, Volume I of *Indian Ephemeris,* the sun's mean longitude on 22nd June 1916, or the 71st completed day of the Indian solar year, is 67·8 degrees or 68·1 degrees, if we include the equation. Now, since each nakshatra is $13\frac{1}{3}$ degrees in extent, it follows that the sun's nakshatra, when he has attained 67·8 degrees of longitude, is past the fifth

nakshatra and in the beginning of the sixth or Ārdrā nakshatra. It is a simple sum in arithmetic, that when the sun's nakshatra at Dakshināyana was Āśleshārdha or Sārpārdha, i.e., the middle of Āśleshā, his longitude must have been $113\frac{1}{3}$ degrees (since the longitude of the commencement of Āśleshā nakshatra is, by Eye-table 8, page 156 supra, 106°, 40′ and its end 120°).

10. *Practical application of precessional chronology.*—We know from modern astronomy that the movement of the precession is 50″ of an arc per annum to the west (see next paper in this appendix), or one degree for every 72 years. Accordingly, for the precession to have moved through an arc corresponding to the interval between $113\frac{1}{3}$ and $67\frac{3}{4}$ degrees, i.e., $45\frac{7}{12}$ degrees, it must have taken $45\frac{7}{12} \times 72 = 547 \times 6 = 3{,}282$ years. Roughly, according to this calculation, the Vedāṅga Jyotisha observation must have been made 3,300 years before A.D. 1916, i.e., about 1400 B.C.

11. *Limitations of precessional chronology.*—Now, supposing we had no information from Varāhamihira himself as to when he lived, but only knew from his works that at the summer solstice in his day the sun was at 90 degrees and in Punarvasu nakshatra, whereas now he is in Ārdrā nakshatra and in 68 degrees longitude, we might argue that the difference between these longitudes, i.e., 22 degrees, multiplied by 72, i.e., 1584, would give us the number of years before A.D. 1916, when Varāhamihira lived. The result would be A.D. 332, or *circa* A.D. 300, whereas Varāhamihira actually wrote about A.D. 550. Allowing the same proportion of error for previous epochs, the antiquity of the Vedāṅga Jyotisha observation, noted above in paragraph 10, may also have to be reduced by 250/1620, i.e., $\frac{2}{13}$; in other words, from 3,300 years to 2,792 years before now, i.e., from B.C. 1400 to B.C. 850. Using the precessional factor of modern astronomy, one degree for 72 years, Mr. Tilak in his *Orion*, and Professor Jacobi in an article first published in a German scientific journal and reproduced in the *Indian Antiquary* for 1894 (page 158), simultaneously declared that the Vedāṅga Jyotisha preceded Varāhamihira's time by 1896 years, and that there was a still earlier period when correct astronomic observations had been made in India, and that was when the Vernal Equinox was in Mrigaśīra nakshatra, longitude 53°, 20′, instead of in Aśvinī, 0° longitude, as in Varāhamihira's time, and that that epoch must have preceded Varāhamihira's own epoch by $53\frac{1}{3} \times 72 = 160 \times 24 = 3{,}960$ years, i.e., that the observation was made, and the Veda in which it is supposed to be alluded to, was composed (not *written*, because writing came long after), about B.C. 3500, i.e., 5,400 years before now. This period also may have to be cut down by 2/13, 5,400 years being reduced to the tune of 900 or 1,000 years, and the vedic antiquity brought down from B.C. 3500 to the region of B.C. 2500. The latter date more nearly approximates what we might call the philologist's vedic period (according to Max Muller, Weber, Macdonnell's *Ind. Lit.*, 1909, page 11, etc.), as distinguished from the astronomers' vedic period.

12. In the controversy which raged in the pages of the *Indian Antiquary* round the speculations of Messrs. Jacobi and Tilak referred to above, it does not seem to have been noticed that what we have called precessional chronology or the system of reckoning past years at the rate of 72 years to a degree of precession is apt to fail under certain conditions. We said, in paragraph 9 above, that if at the present day we tried to make a statement like what the author of the Vedāṅga Jyotisha and Varāhamihira respectively made regarding the date of return of the sun to the south in his annual course, we should say, following our principal guide in these matters, the Sūrya siddhānta, that the sun returned on June 22 when his mean longitude was 67·8 degrees. We would make the statement *that the sun returned southwards on June* 22 by observing the solstice with our own eyes, whereas we would make the statement *that his longitude then was* 67·8 *degrees* by calculating it from the first day of the Indian solar year 1916 A.D. (April 12·7605) when the sun, according to Sūrya siddhānta, attained 0° true sidereal longitude. But we know from paragraph 217 of the text (page 90) that owing to the sidereal error of Indian astronomy, the true sidereal longitude of the sun on April 12, A.D. 1916 (if by true sidereal longitude we understand the state of things which existed *circa* A.D. 530) was $3\frac{1}{3}$ degrees and not 0°. Now the precession moves

$3\frac{1}{8}$ degrees in $\frac{10}{3} \times 72 = 240$ years: and that is why we made a mistake of nearly 240 years when we attempted in paragraph 11 to calculate Varāhamihira's date by means of precessional chronology. And a similar mistake of greater or less magnitude, in proportion to the actual sidereal error, is likely to underlie all statements made by writers, ancient or modern, as to the sun's mean longitude, or, which is the same thing, the sun's nakshatra, at the time of the summer or of the winter solstice. We have to realize that the sun's *solstice* may be found from direct observation, but the sun's *nakshatra* would generally be determined by calculation from the day in the year when the sun is assumed to have reached 0 degree true or mean longitude, and that any error in that day would affect the results of precessional chronology.

13. The fundamental notion of the Vedāṅga Jyotisha is that the Sun at winter solstice should be at Dhanishṭhā nakshatra, at the beginning thereof, and at the summer solstice he should have reached the middle of Sārpa or Āśleshā nakshatra. The Vedāṅga Jyotisha or rather Garga Samhita, which embodies the same ideas but in plainer language lays down as follows :—

Garga's Scheme of the Calendar (*Dikshit*).

—	Uttarāyaṇa = Winter solstice.			Dakshiṇāyaṇa = Summer solstice.		
	Month and thithi.	Sun's nakshatra.	Moon's nakshatra.	Month and thithi.	Sun's nakshatra.	Moon's nakshatra.
1. Samvatsara ...	Māgha ś. 1	Dhanishṭhā ...	Dhanishṭhā ...	Śrāv. ś. 7 ...	½ Āśleshā ...	Chitrā.
2. Parivatsara ...	„ ś. 13	„ ...	Ārdrā ...	„ b. 4 ...	„ ...	P. Bhādrapada.
3. Idavatsara ...	„ b. 10	„ ...	Anurādha ...	„ ś. 1 ...	„ ...	Āśleshā.
4. Anuvatsara ...	„ ś. 7	„ ...	Aśvini ...	„ ś. 13 ..	„ ...	P. Ashaḍha.
5 Idvatsara ...	„ b. 4	„ ...	Utt. Phalguṇi.	„ b. 10 .	„ ...	Rohiṇi.

14. Dr. J. BURGESS in his "*Notes on Hindu Astronomy*" (*J.R.A.S.* 1893), after making the observation that "the figures give, for the moon's sidereal revolution 27·313433 days and for the synodical month 29·516129 days," notes that for every 19 years the synodical months according to the *Vedāṅga Jyotisha* must be in defect by 3·399 days, while the sidereal months would be in defect by 2·093 days and the solar years themselves would be in excess by 14·084 days. Dr. Burgess concludes that the Vedāṅga Jyotisha betrays a "primitive and rough method of observation." Similar remarks occur in the *Vedic Index* of Messrs. Macdonnell and Keith.

15. Mr. Dikshit (page 89) quotes the following from *Garga Samhita* :—

yadā nivartate aprāptah Śravishṭhām Uttarāyaṇē,
āśleshām dakshiṇe (*a*) prāptah tadā vidyān mahadbhayam.

"When the sun turns back without having attained *Śravishṭhā* in his northward journey, or without having attained *Āśleshā* in his southward journey, then know that there will be a great disaster."

Clearly, in Varāhamihira's time, according to his own statement (paragraph 1 supra), the sun was so *far* from having attained *Śravishṭhā* and *Āśleshā* at his winter and summer solstices respectively, that the solstitial turning took place fully 23·20° before Śravishṭhā and Āśleshārdha. Evidently, therefore, the above passage in Garga, if Garga was a real author, must have been composed at a time when the Sun was still visiting Dhanishṭhā and Āśleshā at the two solstices and before there was any likelihood of his turning back without visiting them. At the same time, the passage indicates that this contingency was feared in Garga's time either because something similar had happened before, that is, the Sun had, in still more ancient times, been in the habit of visiting the nakshatra Satabhishaj or Pūrva Bhādrapada before turning north, but a change had taken place in this respect which change had been marked by great disaster; or because the change or tendency to change had already begun to operate. A third inference may with some certainty be drawn from the passage, namely, that there was not even a

suspicion that the gradual shrinking of the Sun's path was in the order of nature; in other words, we may infer that the nature and effect of the precession of equinoxes was not then perceived.

16. We know that the Vedāṅga Jyotisha was still the current system at the time of Kauṭilya's *Arthaśāstra* which seems to have been composed about 300 B.C.; but at that time the Sun's solstices must have been at points which, by modern calculation, could have been only 11 degrees to the east of their positions in Varāhamihira's time; that is, already by 300 B.C. there was no sign of the Sun entering either Āśleshā or Dhanishṭhā nakshatra at the solstices. The time when the abortive return of the Sun became first noticeable must have been when his solstices were about 20 degrees to the east of where they were in Varāhamihira's time, i.e., 20×72=1,440 years before his time, or about 900 B.C., provided (as observed in paragraph 12 supra) there was no sidereal error. At that time the sun at summer solstice would have just fallen short of Āśleshā and would have turned south at 110 degrees instead of at 113 degrees (the middle of Āśleshā); and he would have turned northward at 290 degrees, instead of at 293°, 20′ (Dhanishṭhā) at winter solstice, i.e., 3 degrees short of (Dhanishṭhā) or Śravishṭhā. We may hence infer that the Vedāṅga Jyotisha must have been current before 900 B.C. (provided always there was no sidereal error), and that it continued to be current almost till Varāhamihira's time. If there was a sidereal error of the same sign and quantity as the modern sidereal error (·002361 degree per annum, vide page 90 of text), then the date 900 B.C. would have to be made proportionately later.

17. If, to be on the safe side, we suppose the Vedāṅga Jyotisha was current for even 600 years before the Christian era how did it happen that the primitive and rough method adverted to by Dr. Burgess (vide paragraph 14 supra) did not land its followers in confusion and disaster? Since, as he points out, after 19 years, tithis under the Vedāṅga Jyotisha must occur 3⅔ days late, it must follow that after 19 years people would either have kept new-moon day when a moon 3 days old was shining in the sky or have given up the Vedāṅga Jyotisha altogether. Again it is probably unheard of that any people, however primitive, who follow the lunar calendar, would be so regardless of lunar phases as to keep full-moon when the moon was in the fourth day of her waning.

18. In handling such a system as the *Vedāṅga Jyotisha*, we must first of all assume, as an axiom, that no material deviation from the actual recurrence of tithis and nakshatras was contemplated under it: otherwise, the whole scheme was bound to collapse in 20 years. The scheme was intended to be worked in such a way that once in 5 years Māgha śukla 1 should coincide with "moon in Dhanishṭhā nakshatra" and "Sun in Dhanishṭhā nakshatra" at the time of Uttarāyana. Such schemes in substance are found all over the world. A scheme of this description is called a *tied* lunar calendar; i.e., a lunar calendar so constructed that it may periodically fall into line with the solar year. The Jews and the Greeks, among ancient nations of whose calendars we have precise information, had each of them a tied lunar calendar, but without the special Indian detail of nakshatras. In all such calendars the essential thing is that the recurrence of lunar *tithis*, as we call them in India, or lunar *phases* as they are called in Greek, should correspond to actual fact; and in India, under the Vedāṅga Jyotisha as well as under the later Sūrya siddhānta, which we now observe, there is another tie, that of the nakshatras whose actual recurrence also the calendar should faithfully represent. Such a calendar is subject to a very ready and natural test, because the scheme of tithis can be tested every fortnight by comparison with the full moon and the new moon: there may be an error of a single day, the first *phasis* or appearance of the moon after she has become new being for instance declared by the calendar a day too late or a day too early, but the error would never be permitted to exceed a single day, and would be rectified by dropping a tithi in the count, which we now call a *kshaya* tithi, or by adding a day to the lunar month, making it consist of 30 instead of 29 tithis. The advantage of the Indian *nakshatra* system is that it provides a safeguard and a remedy against an error of even a single day which might occur, as just shown, under a pure tithi system. The moon covers a whole nakshatra space of 13⅓ degrees in the heavens in the course

of a single day; and if the calendar shows her to be in a nakshatra different from that which she actually occupies, we do not want to wait until new moon or until full moon to discover the error, and could rectify it at once by dropping a nakshatra or by prolonging the duration of a nakshatra.

19. The only difference between such a system and the present Sūrya siddhānta system is that under the latter the computation is so perfect that agreement between lunar *phases* or tithis and the daily lunar motion among the nakshatras is secured without the need of adjusting it from month to month by ocular observation, *pratyaksha parīkshaṇaih*. But supposing an adjustment was necessary under the Vedāṅga Jyotisha, it was effected without any practical trouble and the calendar was effectually safeguarded from error just as it is under the present system. Such adjustments in the Jewish and Muhammadan calendars are effected by a kind of judicial process, upon the ocular testimony of persons who declare on oath that they have seen the first crescent or lunar phasis on a particular evening (see Text, page 70, paragraph 163).

20. The same remark applies to the connected solar calendar of the Vedāṅga Jyotisha, though here the correction may have had to be deferred for a longer period; but here again, in the long run, there could have been no material deviation from solar phenomena. The ancient Indians of the *Vedāṅga Jyotisha* period kept two distinct reckonings of the sun's motion, although they were unconscious of the distinction. They noticed the four principal stages of the sun's motion, the summer and winter solstices (dakshiṇāyana and uttarāyaṇa) and the two equinoxes (vernal and autumnal, called *Vishu*), especially the solstices, and they also noticed the nakshatra occupied by the sun from fortnight to fortnight, just as they noticed the nakshatra occupied by the moon from day to day, and the *paksha* or half lunar month from fortnight to fortnight. The sun moves through a nakshatra space in 13·528013 days, according to modern European astronomy, and in 13·528102 days according to the second Sūrya siddhānta. Although we cannot visibly see the sun occupying a particular nakshatra space by day, we know from the nakshatra coming to the zenith at midnight that the sun must *then* be in a nakshatra 180 degrees removed from the zenith nakshatra; so that, if we have previously mapped out the ecliptic into 27 nakshatra spaces (whether equal or unequal does not matter for our present purpose), we should know, from the zenith nakshatra at midnight, what nakshatra the sun was in at that moment; and since the nakshatra space or any part of it can occupy the zenith for only 13½ days, it follows that an error in the calendar regarding the sun's position among the nakshatras can be detected after 13½ days, in any case after 27 days, or after the sun has done two nakshatra spaces. We have an illustration of this method of observation in the Tamil anthology, *Puṟanāṉūṟu* (selection No. 229), which says that the nakshatra Pūrva Phalguni (long. 133·0°) was on a particular day declining from the zenith at midnight, which means that the sun was then past 133°+180°=313° longitude, in other words, that it was then solar Panguni-Kumbha month.

21. We may say a word about the tied lunar year, as now observed in India. Neglecting for the moment the solar year and solar months observed in the Tamil country, what takes place over the rest of India, is this. The lunar year is tied to the solar year, but it is tied loosely, that is, in such a way that the lunar year may begin from 1 to 29 days before the solar year, but it must begin before the solar year and within one month before the commencement of the solar year.

22. Similarly, although the Vedāṅga Jyotisha says that 5 years should consist of 1,830 days, or 62 synodical months, or 61 sidereal months, it did not mean that any extensive deviations from the *actual* solar and lunar phenomena should be permitted for the sake of the 1,830 days. What actually took place under the Vedāṅga Jyotisha may be ascertained by studying the actual decursus of solar and lunar phenomena under such a system over a long series of years.

23. Tables A and B giving this information for periods of 5, 30, 35, 160, 315, 480 and 540 years are appended below. The figures for the first 30 years are simply those for the years A.D. 1897 to A.D. 1927 extracted from "*Indian Ephemeris*,

A.D. 1800 to *A.D.* 2000." It will be seen that on 2nd February 1897, the first year of the first cycle of five years began, as required by the Vedāṅga Jyotisha, on Māgha śukḷa 1 with the sun and the moon in nakshatra Dhanishṭhā. Every year, up to and exclusive of 1926, contains 365, 366 or 367 days, so that by the end of 29 years the sun at winter solstice has advanced 29 days from the point whence he started in 1897. In the last year 1926 if, as usual at the end of every cycle, an *adhika* month were inserted, the sun would be found to have passed from Dhanishṭhā into Satabhishaj and from Satabhishaj into Pūrva Bhādrapada. If, on the other hand, the usual adhika month was *not* added at the end of the sixth yuga of five years, a new yuga would begin on 3 February 1927, Māgha śukla 1, when the moon was in Dhanishṭhā and the sun's longitude at sunset would be 292 degrees, that is, practically, the beginning of Dhanishṭhā. Seeing that the indispensable rule was to begin a new cycle on Māgha śukḷa 1 with the sun and moon in Dhanishṭhā nakshatra, and it was not and could not be an indispensable rule to have 366 days to a year, this course would have suggested itself to the astronomers and almanac framers of the day automatically in any period of 30 years or six yugas under the Vedāṅga Jyotisha; by "automatically" we mean, quite naturally, and without deliberately infringing any of the rules of the Vedāṅga Jyotisha. In this sense we need not call the procedure a correction, because a correction is a deliberate innovation. Our illustration in Table A, page 14, applied to a 30-year period, shows that the rule about reckoning 366 days to a solar year has to be subordinated in practice to the rule about beginning every new cycle with Māgha śukḷa 1 when the sun and moon should both be in *Dhanishṭhā*. A glance at the *Indian Ephemeris* for the 30 years A.D. 1897 to A.D. 1927 (Table A, pages 454–55 below) will show that even during the course of the 30 years the year is occasionally one of 365 days and sometimes 367, and we should realize that in the Indian calendar at all times, including our own, the length of the year, whether lunar or solar, cannot be restricted to a certain number of integral days. We are accustomed now-a-days to the European calendar which is tied *fast* to the New Style, just as it was tied fast for 1,600 years before to the Julian or Old Style, while its months January to December are very loose; in fact the months correspond only roughly to the passage of the sun through each successive sign of the zodiac, or for the matter of that, through the successive constellations of the zodiac. The sun enters the *signs* about the 21st of each month and the *constellations* at the present time about the 15th *of each* month, but the European system of solar months represents neither the entry of the sun into the signs of the zodiac, nor his entry into the successive constellations of the zodiac or nakshatras.

24. The Sūrya siddhānta system at present observed all over the country and the Vedāṅga Jyotisha, which preceded the Sūrya siddhānta and which appears to have been observed for an equally long time, and over an equally large extent of country, both lay stress on the precise ascertainment of the days of new moon and full moon and of the intermediate tithis or stages, and they also lay stress on the nakshatra which the moon occupies each day. They do not, and could not, play fast and loose with the moon's phases and the moon's nakshatras. They do not seem to have been, or to be, equally precise about the number of integral days to be reckoned to a year. The Sūrya siddhānta only stipulates that the lunar year shall begin within 29½ days before the Mēsha sankrānti, while the Vedāṅga Jyotisha stipulated that the year should begin at uttarāyaṇa, i.e., at or after winter solstice when the sun should have at least reached *Dhanishṭhā* nakshatra.

25. A period of 15 years would have been enough to show the calendar makers under the Vedāṅga Jyotisha that after that period, i.e., after only three yugas of five years each, the sun would be 13 or 14 days *past* Dhanishṭhā when he reached winter solstice. It is an inevitable postulate under a scheme like that of the Vedāṅga Jyotisha where so many coincidences are necessary for a cycle of five years, viz., (1) Māgha śukḷa 1, (2) Moon in Dhanishṭhā, (3) Sun in Dhanishṭhā, and (4) Sun in winter solstice, that some of the mutual concomitants must be regarded as indispensable and the others must be treated somewhat loosely. That the

moon should be in Dhanishṭhā and that the day or tithi should be Māgha śukla 1, were no doubt regarded as indispensable items, and in fact the length of a cycle was fixed at 1,830 days with full knowledge that that was the whole number of days constituting 62 synodical and 67 sidereal months, respectively (1,830·896 days and 1,830·552 days), and with equally full knowledge that it did *not* correctly represent five tropical years, that is, five returns of the sun to the same solstice. A tropical year, according to modern astronomy, consists of 365·2422408 days. Five such years would be completed in 1826·211204 days, that is, $4\frac{3}{4}$ days short of the period necessary for the completion of 62 synodical months. We might at first think it strange that the framers of the Vedāṅga Jyotisha calendar should have been so ignorant or so careless as to perpetrate an error of $4\frac{3}{4}$ days for every five years, or nearly one day for every year, and this is what Dr. Burgess and other writers on the subject have assumed. But the error is so palpable that we are driven to conclude that there was some explanation which is not on the surface. We shall find a satisfactory explanation if we view the matter from a practical standpoint. For their purpose, it was necessary to observe the return of new moons and full moons and it was also necessary to observe the intermediate tithis and nakshatras of the moon very strictly. By "strictly," we do not mean that they allowed for the moon's anomaly, which at that time they seem to have been unaware of, but they evidently saw to it that the calendar brought out the mean tithis and mean nakshatras correctly. Accuracy in these respects was sufficiently assured by a cycle of 62 lunar synodical months and 67 lunar sidereal months. An excess of one day per annum in the solar year meant the movement of the sun through one nakshatra space in excess of 360 degrees once in $13\frac{1}{3}$ years and in 30 years the excess would be two nakshatra spaces. We must assume, though we are not so told, that a system which was current for at least 1,000 years made some provision to guard against an error of two nakshatra spaces in the sun's position accumulating after barely 30 years.

26. The Vedāṅga Jyotisha scheme supposes the insertion of an adhika or intercalary lunar month in the middle of the third year and at the end of the fifth year of every yuga. This intercalation was necessary, since otherwise the sun would not reach at the end of the first five lunar years of 12 lunar months each, the nakshatra whence he started. But if at the end of six yugas or 30 years the sun was already in the nakshatra from which he had started at the beginning of the first yuga without the need of intercalating a lunar month, then obviously it was not necessary to intercalate the second *adhika* month at the end of that yuga. The principle, now observed under the Sūrya siddhānta, of inserting an adhika month only when necessary to bring the sun to his expected nakshatra must have been observed at least to this extent under the Vedāṅga Jyotisha.

30 true tropical years (modern) = 10,957·27 days.
30 true sidereal years (modern) = 10,957·69 days.
371 synodical months (6 × 62 less 1) = 10,955·85 days.

At the end of this latter period the sun would be 1·84 days short of the nakshatra from which he had started on his first yuga. In five cycles of 30 years each or 150 years, the sun would be 5×1·84 = 9·2 days short of the nakshatra from which he is assumed to start at the beginning of each five year period. This deficiency would be made up, however, at the end of two more yugas of five years each when the sun would have been 2×4·64=9·28 days further on his nakshatra-path than he had been at the beginning of the yuga following 150 years.

27. The net result, as we may see more precisely from the printed Table B, page 456 below, was that the Vedāṅga Jyotisha year, by the natural and spontaneous device of dropping the adhika month when it was not required, that is, at least once in 30 years, could, after 160 years, be converted in practice into a true modern sidereal year, not differing from the latter up to four decimal places.

28. *Comparison with the Julian and Gregorian Calendars.*—The Julian calendar, as modified by Pope Gregory XIII, established a standard of accuracy by counting 365 days to a year, and making the requisite periodical adjustments by (1) adding an

extra day for every four years, and (2) dropping these extra days three times in the course of 400 years. The Vedāṅga Jyotisha attained the same end by treating every year as a year of 366 days and making the necessary adjustments once in 30 and once in 480 years. In the case of the Julian and Gregorian calendars, the reforms had to be carried out by statute, or by papal bull; in the case of the Vedāṅga Jyotisha the reform operated in virtue of the very necessities of the case, viz., the necessity of bringing the sun up to Dhanishṭhā nakshatra (once in 480 years) and the necessity of bringing him back to nakshatra Dhanishṭhā once in 30 years.

29. It thus happens that 30 years' and 160 years' cycles are also nearly perfect cycles of nakshatra or sidereal months under the Vedāṅga Jyotisha system. For, the 30-year period or 371 synodical months, or 10,955·85 days comprise 401 complete sidereal months less ·14 of a day—see printed Table A (page 455); while the 160-year period or 58,441·03 days contain 6,417 sidereal months less ·02 of a day. This shows that at the end of the periods in question the moon as well as the sun would enter its original nakshatra, Dhanishṭhā.

30. We have made the calculation on the assumption that the correct modern or Sūrya siddhānta periods for the synodical month and sidereal month were observed under the Vedāṅga Jyotisha, and we are justified in doing this, because the Vedāṅga calendar had continually in sight the lunar phases and the nakshatras of both sun and moon. It might go wrong occasionally by a tithi or a nakshatra, but it would be set right at once by comparison with the heavens.

31. It is otherwise with the Vedāṅga *tropical* year, because the Vedāṅga Jyotisha astronomer had not the same opportunity and the same practice of frequently setting right his calendar with reference to the *sun's* nakshatra. There was nothing absolutely to prevent his doing so, because he could ascertain the sun's nakshatra by watching the nakshatra which came to the zenith at midnight (see paragraph 20 supra), but if he made a correction in the sun's nakshatra before a synodical or sidereal month became complete, the sun's movements would cease to keep pace with those of the moon, and the jyotishya (or astronomer) ran the risk of disturbing the daily lunar reckoning which in his estimation was of far more importance than the solar reckoning. Therefore, before making a correction in the solar reckoning, he would wait until the lunar reckoning was brought up by at least one complete circuit. We saw above that he probably adopted this plan once in 30 years. He may have effected the correction at other times, but the point is that *whatever corrections were effected would be reducible to this standard.*

32. This leads us to the second reflection. If after 160 years, and by virtue of corrections made every 30 years, the Vedāṅga Jyotisha year was brought to the same standard of accuracy as a modern sidereal year, whereas what that system was in search of, though unconsciously, was a tropico-sidereal year, then like the Julian year, the Jyotisha year also needed a Gregorian reform. Precisely so: but before we mention the reform, it will be instructive, and it will serve to test our knowledge of first principles, to realize what exactly were the difficulties which confronted the Vedāṅga Jyotisha astronomers after 480 years.

33. In the first year after the lapse of 160 years, the sun and moon had to be in nakshatra Dhanishṭhā at uttarāyaṇa or winter solstice. We have seen that after 160 such years as we have supposed, the moon would exactly reach nakshatra *Dhanishṭhā*. For the sun to reach exactly *Dhanishṭhā* as in year 0, it would take by modern astronomy, $160 \times 365{\cdot}236354 = 58{,}441{\cdot}02$ days.

For the sun to reach exactly uttarāyaṇa, it would take 160 tropical years (modern) $= 160 \times 365{\cdot}2422408 = 58{,}438{\cdot}76$ days.

We saw above that the cycle of 160 luni-solar Vedāṅga years would be completed in 58,441·03 days.

Difference between 160 Vedāṅga years and 160 true tropical years, 2·26 days.

Difference between 160 Vedāṅga years and 160 true sidereal years, ·01 day or 15 minutes of time.

That is, after 160 years, the Vedāṅga Jyotisha astronomer would announce the sun as entering nakshatra Dhanishṭhā on the exact day on which this entry would take place according to modern astronomy, with a difference of only 15 minutes of time, and he would be thinking of proclaiming the advent of *uttarāyaṇa* or winter solstice at the same moment when, however, the sun would have turned back from the solstice and have done 2¼ days on his northward journey, instead of merely starting just then on that journey, as prescribed in the Vedāṅga scheme. If he noticed the latter phenomenon, namely, the acceleration of the solstice, for really it was such, the jyotishya or astronomer would have become aware that the sun had done that which Garga had predicted would be the forerunner of disaster (page 446, paragraph 14 supra), viz., he had turned on his northward journey 2¼ days *before* reaching Dhanishṭhā. After 12 times 160 years, or 1,920 years, the divergence between the nakshatra and the solstice and the probability of impending disaster would become quite patent, because by then the sun would have turned back from the solstice some 27 days before either Māgha śukla 1, or the official uttarāyaṇa was announced, although the official almanac would correctly represent the sun as having just reached Dhanishṭhā. The error was corrected in Varahamihira's home by finally abandoning the solstitial or tropical year for purposes of civil reckoning and adopting the sidereal year instead. It will be shown in the next paper that this change of practice must have been adopted with reference to A.D. 532 as an epoch or new starting point.

34. We might similarly compare the state of things under the Vedāṅga Jyotisha after 30 years.

The sun's return to winter solstice would be accomplished in 30 tropical years = 10,957·267 days.

30 true sidereal years which would bring back the sun to nakshatra Dhanishṭhā = 10,957·691 days.

Difference, ·42 of a day.

30 Vedāṅga Jyotisha years or 371 synodical months (vide paragraph 26 supra) which were expected to bring back winter solstice and nakshatra Dhanishṭhā, according to Jyotisha reckoning, would take 10,955·85 days.

35. We are now in a position to understand the statements made by Varāhamihira in regard to Vedāṅga Jyotisha. He says that in his time the sun's longitude at summer solstice was in the Karkaṭaka rāśi (90 degrees) while his longitude at winter solstice was in Makara rāśi (270 degrees); that formerly the solstices were in the middle of Āśleshā (113 degrees, 20 minutes), and the beginning of Dhanishṭhā (290 degrees, 20 minutes), and that these positions were correct at that time. It is inferrible from this passage that though the Vedāṅga Jyotisha still assigned the same longitudes as before (Āśleshārdha and Dhanishṭhādi) to the sun at the two solstices, these positions were no longer correct, in Varāhamihira's time "as any one might see with his own eyes" (*pratyaksha-parikshanaih*).

36. We have seen that taking a long period of 160 years the Vedāṅga Jyotisha was probably correct as to the length of the sidereal year, the length of the synodical month and the length of the sidereal month, in other words, that when it said that a yuga of 5 years should begin with Māgha śukla 1 at the winter solstice, with the sun and moon in nakshatra Dhanishṭhā, all these items, except as to the solstice, came out quite correct once in 160 years, and that in the opinion of Varāhamihira, the solstice was also correctly recorded by the Vedāṅga Jyotisha *at one time*. What that time was would not be a matter involved in doubt if we knew for certain that the equinox had moved through an arc equal to the interval between the beginning of Dhanishṭhā (293° 20′) and the beginning of Makara (270 degrees), or which is the same thing, and which we also hold on the authority of Varāhamihira, between the half of Āśleshā (113° 20′) and the beginning of Karkaṭaka rāśi (90 degrees). Applying these intervals to the summer solstices, we may infer that when Varāhamihira says the sun turned south in his time from Punarvasu nakshatra (80° to 93° 20′) he means that in his day the summer solstice was at 90 degrees of the sun's longitude, i.e., in the last quarter or pāda of Punarvasu; first, because anything before 90 degrees would not be in Karkaṭaka rāśi, where also he says the sun was

at summer solstice in his time, and secondly because 90 degrees is the result of deducting 23° 20′ from Āśleshārdha, 113° 20′, the position in Vedāṇga Jyotisha But supposing the solstices in Varāhamihira's time were at 93 degrees and 273 degrees, respectively, and these more ancient solstices, i.e., those under the Vedāṇga Jyotisha were at 113° 20′, and 293° 20′, respectively; the statements made by Varāhamihira would still be strictly correct, although we cannot but observe that a longitude of 93 degrees would be correctly described by a lay observer as being in Pushya rather than in *Punarvasu* nakshatra.

37. Supposing, for argument's sake, that we took the full 23° 20′ to be the movement of precession between the two epochs, that would not be accounted for except by conceding an interval of 1,680 years between Varāhamihira and the Vedāṇga Jyotisha. We may determine Varāhamihira's epoch for our purposes as being A D. 532 (See paper ii in this appendix, page 458, paragraph 7) according to Sūrya siddhānta methods, and we may do so on considerations independent of Varāhamihira's own statements, though his statements present no serious divergence from our determination. If so, the period of the Vedāṇga Jyotisha observation may be safely taken as not later than A.D. 1680 minus 531 = 1149 B.C., provided, as before, there was no sidereal error in the Vedāṇga Jyotisha calculation of the sun's mean longitude.

38. The statement about the winter solstice being in Māgha lunar month occurs in several ancient works.

VEDĀṆGA JYOTISHA: verse 74.

> Prapadyete śravishṭhādau sūryacandramasā vudak
> sārpārdhe dakshiṇārkāstu māgha śrāvaṇayoh sadā.

i.e., "Uttarāyaṇam takes place when sun and moon join in Śravishṭhā at the beginning of Māgha. In Śravana month at the half of Āśleshā the sun has his dakshiṇāyana."

GARGASAMHITA (quoted by Dikshit) verses 4, 5.

> yadā māghasya śuklasya pratipadi uttarāyaṇam
> sahodayam śravishṭhābhih somārkau pratipadyatah
> tadatra nabhasah śukla saptamyām dakshiṇāyanam
> sārpārddhe krute yuktim chitrāyāmcha niśākare

"When sun and moon join in Śravishṭhā or śukla 1 of Māgha, it is uttarāyaṇa, and then dakshiṇāyaṇa is on śukla 7 of Śravana month, when the sun is the middle of Āśleshā and moon is in Chitrā nakshatra."

Baudhayana Srauta Sūtra (cited by Mr. Shāmaśāstri in his *Gavamayana*).

> māghe māsi dhanishṭhābhih uttareṇaiti bhānuman
> ardhāśleshaśravanasya dakshiṇe upanivartate

"In the month of Māgha the sun goes north with the asterism Dhanishṭhās; in the month of Śrāvana he returns south in the middle of the asterism Āśleshā."

39. Probably the earliest reference to the fact that the winter solstice coincided with Māgha śukla 1 is that in the Kaushītaka Brahmaṇa (quoted from Weber in *Macdonnell and Keith's Vedic Index*) which says that the solstice falls *Māghasya amāvāsyāyām.*

Probably again the latest reference to the Vedāṇga Jyotisha arrangement is to be found in Kauṭilya's *Arthaśāstra*, whose date has been placed by Dr. Fleet as well as by Mr. K. V. Rangaswami Ayyangar about 300 B.C. In the *Arthaśāstra* the remark is made that the seasons from *śiśira* (Māgha and Phālguṇa) are uttarāyana, and those from *varsha* (Śravaṇa and Proshṭhapada) are dakshiṇāyana. Surely in 300 B.C. the winter solstice was not in the same nakshatra on Māgha śukla 1 as it had been in 1100 B.C.; but here again, if we reflect carefully on the Indian practice when speaking of the calendar, we shall be convinced that the retention in the Arthaśāstra of the ancient solstitial coincidence was not unjustifiable.

40. To the Indian still, as in the Vedāṇga Jyotisha period, the essential thing is the lunar month and tithi and the moon's nakshatra. During the currency of the Vedāṇga Jyotisha, there was a further preoccupation, that the

sun's uttarāyaṇa should not occur *before* he had reached Dhanishṭhā nakshatra. That uttarāyaṇa was announced late, i.e , a few days *after* the sun had turned north, provided he had reached nakshatra Dhanishṭhā, was a matter of little consequence. It is outraging the common sense of the people who constructed the Jyotisha to suppose that they did not know that in a 5 year period of 1830 days and 366 days to a year, the sun would not be entering into uttarāyaṇa on the same day each year, but must enter it a day earlier each year. Moreover, "uttarāyaṇa" means the northward journey of the sun and not merely his entry on the northward journey; and provided the sun and the moon had reached their respective nakshatras at or before the commencement of the year, it did not matter if uttarāyaṇa in the sense of the *entry* into uttarāyaṇa, was some days past.

41. We can account for a year of 366 days only on the supposition that a correction was made, though at long intervals, and we have seen that on the principles of the calendar, a correction would naturally suggest itself once at the end of every 30 years and again at the end of every 480 years. It may be that the first correction was made at the end of 35 or 40 years and the second correction at the end of 510 or 540 years. For Indian purposes, a correct sidereal year is, and was probably at all times, not excluding the vedic period, more useful than a correct tropical year. That it should have been so even during the period when a tropical calendar was in use may appear surprising, but the Vedic and Vedāṅga Jyotisha calendars were not tropical but tropico-sidereal. A strictly tropical calendar would very soon necessitate a deviation from the scheme of nakshatras for the different ayanas in the different years of a yuga: Hindu usage abhorred any such deviation. Why they abhorred it is another question. Varāhamihira says in his Brihat-samhita that if the sun should turn north without reaching *Dhanishṭhā* it portends disaster to people in the north and if he turns south without reaching the half of Āśleshā, he portends disaster to those in the south. This statement seems to establish (1) that the solstice had at some previous time actually got away from its then nakshatra and that the Vedāṅga Jyotisha then made a last endeavour to tie the solstitial sun firmly to the nakshatra Dhanishṭhā; (2) that men in those days did not, as we do now, expect the precession to move definitely at a certain pace every year, but that at long intervals of years they woke up dimly to the discovery that the solstices had got away somehow and unaccountably from their fast friends the nakshatras; (3) that a divergence of a solstice from its nakshatra was noticed only when the nakshatra was not reached, not when the nakshatra having been reached, uttarāyaṇa was kept for civic and religious purposes a few days or even whole weeks late.

THE VEDANGA JYOTISHA CALENDAR—TABLE A.

Annuary for 30 years applied to the years A.D. 1897—A.D. 1927.

Garga's Scheme of the Calendar (Dikshit).

	Uttarāyaṇa = Winter solstice			Dakshiṇāyaṇa = Summer solstice.		
	Month and tithi.	Sun's nakshatra.	Moon's nakshatra	Month and tithi.	Sun's nakshatra.	Moon's nakshatra.
1. Samvatsara ...	Māgha s. 1.	Dhanishṭhā.	Dhanishthā.	Śrāv. ś 7.	½ Āśleshā.	Chitrā.
2. Parivatsara ...	„ ś. 13.	„	Ārdrā.	„ b 4.	„	P. Bhādrapadā.
3 Idavatsara ...	„ b. 10	„	Anurādhā.	„ ś. 1.	„	Āśleshā.
4. Anuvatsara ..	„ s. 7.	„	Aśvinī.	„ ś. 13	„	P. Āshaḍhā.
5. Idvatsara ..	„ b. 4.	„	Utt Phalgunī.	„ b. 10.	„	Rohiṇī.

1 { (1) A.D. 1897 February 2 Māgha Śukla 1, Moon in Dhan. Sun in Dhanishṭhā.
(2) A.D. 1898 „ 3 „ „ 13, „ Ārdrā.
(3) A.D. 1899 „ 4 „ Bahula 10, „ Anurādhā.
(4) A.D. 1900 „ 5 „ Śukla 7, „ Aśvinī.
(5) A.D. 1901 „ 6 „ Bahula 4, „ Uttara Phalgunī.

2	(6)	A.D. 1902	February	8	Māgha	Śukḷa 1,	Moon in	Dhanishṭhā.
	(7)	A.D. 1903	„	9	„	„ 13,	„	Ārdrā.
	(8)	A.D. 1904	„	10	„	Bahula 10,	„	Anurādhā.
	(9)	A.D. 1905	„	10	„	Śukḷa 7,	„	Aśvinī.
	(10)	A.D. 1906	„	12	„	Bahula 4,	„	Uttara Phalgunī.
3	(11)	A.D. 1907	„	12	„	Śukḷa 1,	„	Dhanishṭhā.
	(12)	A.D. 1908	„	13	„	„ 13,	„	Ārdrā.
	(13)	A.D. 1909	„	14	„	Bahula 10,	„	Anurādhā.
	(14)	A.D. 1910	„	15	„	Śukḷa 7,	„	Aśvinī.
	(15)	A.D. 1911	„	16	„	Bahula 4,	„	Uttara Phalgunī.
4	(16)	A.D. 1912	„	18	„	Śukḷa 1,	„	Dhanishṭhā.
	(17)	A.D. 1913	„	18	„	„ 13,	„	Punarvasu (not Ārdrā)
	(18)	A.D. 1914	„	18	„	Bahula 10,	„	Anurādhā.
	(19)	A.D. 1915	„	20	„	Śukḷa 7,	„	Bharaṇī (not Aśvinī).
	(20)	A.D. 1916	„	22	„	Bahula 4,	„	Hastā (not Uttara Phalgunī).
5	(21)	A.D. 1917	„	21	„	Śukḷa 1,	„	*Dhanishṭhā.*
	(22)	A.D. 1918	„	22	„	„ 13,	„	Punarvasu (not Ārdrā).
	(23)	A.D. 1919	„	24	„	Bahula 10,	„	Jyeshṭha (not Anurádhā).
	(24)	A.D 1920	„	25	„	Śukḷa 7,	„	Bharaṇī (not Aśvinī).
	(25)	A.D. 1921	„	25	„	Bahula 4,	„	Hastā (not Uttara Phalgunī).
6	(26)	A.D. 1922	„	26	„	Śukḷa 1,	„	*Dhanishṭhā.*
	(27)	A D. 1923	„	28	„	„ 13,	„	Pushya (not Ārdrā).
	(28)	A.D. 1924	„	28	„	Bahula 10,	„	Jyeshṭhā (not Anurādhā).
	(29)	A.D. 1925	„	28	„	Śukḷa 7,	„	Bharaṇī (not Aśvinī).
	(30)	A.D. 1926	March	2	„	Bahula 4,	„	Hastā (not Uttara Phalgunī).
	(31)	A.D. 1927	„	3	„	Śukḷa 1,	„	Śatabh. (not Dhanishṭhā). **N.B.**—Sun's Long. on March 3 = 319° = nearly P. Bhad. (320°) not Dhanishṭhā = 293 3°.
			February	3	„	„ 1,	„	Dhanishṭhā **N.B.**—Sun's Long. on February 3 = 292°, i e., practically, Dhanishṭhā (= 293·3°).

30 Years' Cycle (Vedāṇga Jyotisha).

(1) 30 true tropical years (modern) = 10957·27 days. (365·2422408 d. a year).
(2) 30 true sidereal years (modern) = 10957·69 days. (365·256354 d. a year).
(3) 371 synodical months (6 × 62 less 1) = 10955·85 days. (Sūrya siddhānta, at 29·530588 days per month).
Difference between (2) and (3) = 1·84 days for every 30 years.
(4) 401 sidereal lunar months (6 × 67 less 1) = 10955·99 days. (Sūrya siddhānta at 27·32167 days to each sidereal month)
Difference between (3) and (4) = ·14 of a day.

480 Years' Cycle (Vedāṇga Jyotisha).

(5) 480 true tropical years (modern) = 175,316·275584 days.
(6) 480 true sidereal years (modern) = 175,323·0432 days.
(7) 480 Vedānga Jyotisha years (16 × 371 months + 1 month) = 175,323·100956 days.
(8) Difference between (5) and (7) = 6·8 6 days.
(9) „ (6) and (7) = ·057 day = 1 hr. 26′ for 480 years, or 10 seconds of time per annum.
(10) „ (5) and (7) for 1440 (= 3 × 480) years is 20·478 days.
(11) 6417 lunar sidereal months (16 × 401 + 1 month) = 175,323·156 days.
(12) Difference between (7) and (11) = ·05543 of a day.

Conclusion (*a*) The Vedāṇga Jyotisha year would, in the course of 480 years, become a true sidereal year, differing from the modern true sidereal year by 208 palas for 480 years, or by less than half a pala or 10 seconds of time per annum.

(*b*) From differences (9) and (12) it follows that after 480 such Vedāṇga Jyotisha years as are here supposed, the yuga of 5 years must begin once more with Māgha śukḷa 1, the Moon in Dhanishṭhā, and sun in Dhanishṭhā.

(*c*) From difference (10) it follows that a period of at least 1440 years must, other considerations apart, separate the commencement of the Vedāṇga Jyotisha era from Varāhamihira's epoch.

THE VEDĀṄGA JYOTISHA TABLE B—Examples of Yuga, Cycle and Exeligmos.

	I	II	III	IV	V	VI
	Yuga of 5 years. 12 Synodical months to a year *plus* 2 adhika months, added at the end of 2½ years and 5 years respectively. No. of Synod. mos.=62. No. of Sidereal mos. to a yuga=67	*Cycle* of 30 years. 6 yugas like I; last yuga has 61 Synod. mos. not 62 and 66 Sid. mos. not 67. 6×62−1=371 Synodical months. 6×67−1=401 Sidereal months.	*Cycle* of 35 years. 7 yugas like I; but last yuga has 61 Synod. mos. not 62 and 66 Sid mos not 67. 7×62−1=433 Synodical months 7×67−1=468 Sidereal months.	*Exeligmos* of 160 years 5 cycles, like II, of 30 years each *plus* 2 ordinary yugas like I. 5×371+2×62=1979 Synodical mos. 5×401+2×67=2139 Sidereal mos.	*Exeligmos* of 315 years. 9 cycle, like III, of 35 years each. Last yuga of last cycle has 60 Synod. mos. not 61, and 65 Sid. mos. not 66. 9×433−1=3896 Synodical mos. 9×468−1=4211 Sidereal mos.	*Exeligmos* of 540 years. 18 cycles, like II, of 30 years each. Last yuga of last cycle has 62 Synod mos. not 61, and 67 Sid. mos. not 68. 18×371+1=6679 Synodical mos. 18×401+1=7219 Sidereal mos.
A. Total number of days in Synodical months composing each yuga, cycle or exeligmos. [Sūrya Sid. Synod. mos.=29 530588 days]	1830·90	10,955·85	12,786·74	58,441·03	115,051·17	197,234·83
B. Total number of days at the rate of 365 2422403 days to a tropical year (modern).	1826 21	10,957 27	12,783·48	58,438·76	115,051·29	197,230·81
C. Total number of days at the rate of 365·256354 days to a Sidereal year (modern).	1826 28	10,957·60	12,783 97	58,441·01	115,055·64	197,238·40
D. Total number of days at the rate of 27·32166 days to a Sidereal lunar month (modern).	1830 55	10,955 99	12,786 56	58,441·05	115,051·68	197,235·35
E Average No. of days in (1) Ved. Jyo. Synodical month.	29·53/3225	29 530/090	29 53/118	29 53057/1 (mod. synodical month.)	29 5305/44	29·5306/183
(2) ,, ,, Sidereal month.	27 32/835	27 3216/96	27·32/265	27·3216/45 (mod. sidereal month.)	27·321/54	27·3216/51
(3) ,, ,, year.	365/2000	365·2/0000	366/343	365 256/25 (mod. sidereal year.)	365·24/127 (modn. trop. yr)	365 25 (A Julian year.)

N.B.—1. The averages are obtained by dividing the nearest integer in each column against A by total number of years or months as the case may require.

2. No. of decimal places to which each average is correct by modern standards is indicated by a cross bar.

Explanatory Note

The working of the Vedāṅga Jyotisha calendar was very much like the working of the modern Indian calendar in that during the currency of a normal yuga of 5 years, i e , a yuga beginning when the Sun as well as the Moon was in nakshatra Dhanishṭhā on Māgha śukla 1, the lunar month of Māgha might begin any time from 0 to 29·50 days *before* the Sun had reached Dhanishṭhā (29⅓), just as the modern lunar year (Chaitra pratipada) begins at intervals varying from 0 to 29·5 days *before* the Sun reaches Aśvinādi or Méshadi (0°), but after the expiry of the first normal yuga, the month of Māgha would begin at varying intervals, from 4¼ to 2½ days *after* the Sun had reached Dhanishṭhā nakshatra A year in which the month of Māgha was going to begin 29½ days *after* the Sun had reached Dhanishṭhā would be a year when the 62nd month would begin *with* the Sun in Dhanishṭhā. In such a case all that was necessary to rectify the calendar was to drop the Adhika month, viz., the 62nd month and make the month of Māgha begin *at once*, i.e , without being preceded by an Adhika month. This procedure would follow *automatically* from the very notion of an Adhika month.

What is indicated in the Vedāṅga Jyotisha is only a first outline of the general calendar. We must remember that at the time writing was not known and the rules had to be committed entirely to memory. As usual such rules were brief and apophthegmatic, laying down principles rather than formulæ.

It has not hitherto been suspected that the rule about inserting an adhika month twice in the course of five years must have been subject to exceptions A little reflection will show, however, that an adhika month had to be inserted only when necessary. It is clearly laid down in Kautilya's Arthaśāstra that against a month of 30 civil days the Moon loses ½ day and the Sun gains ½ day, and that when the difference between the Sun's and the Moon's movements amounts to a month, an adhika month is added. The deviation at any moment from the standard yuga could be measured by the Sun's nakshatra, no deviation except of a trivial nature being permitted in regard to the Moon's tithi and the Moon's nakshatra. If the Sun's nakshatra was 29 50 days short of Dhanisthā, then an adhika month was added and the same consideration would lead to the converse rule (though this is not expressly stated) that if the Sun had reached Dhanishthādi 29½ days before Māgha śukla 1, the lunar calendar should lose an adhika month

Examples are given above of different periods after which a rectification of the Vedāṅga Jyotisha calendar might have been effected by dropping or adding an adhika month.

The shortest period within which the error could have been rectified was 30 years or 6 yugas. If an adhika month (synodic as well as sidereal) was dropped at the end of 30 years, the above table shows that as the immediate result the length of the synodical month as well as of the sidereal month would have been considerably improved. The length of the solar year would have become 365 2 instead of 366 2 days. By continuing this correction for 5 cycles of 30 years and tabulating progress after 2 more ordinary yugas of 5 years each, we reach a surprising result; viz , an exeligmos of 160 years yielding an almost *perfect synodical month*, an almost *perfect sidereal month* and an almost *perfect sidereal year* The mean periods of the Vedāṅga Jyotisha, thus adjusted, are so perfect that they could have been observed for 10,000 years without the year going wrong by a single day.

Compared with this exeligmos of 160 years, those for 315 and 540 years are less interesting, but they offer alternative adjustments of the Vedāṅga Jyotisha calendar, and they are exhibited for the purpose of showing that whether the makers of an almanac under the Vedāṅga Jyotisha had, or had not, an idea of an exeligmos, they would have been led, by the very notion of an adhika month, to drop an adhika month once in 30 or once in 35 years, and restore it again when necessary

All the cycles converge to about 1,600 years by Varāhamihira's time, when the Sun at uttarāyana was short of Dhanishthā by about 22½ days. This is exactly the difference between B and C under col. IV for 1 600 years. For 10×2·25=22·5 days.

The difference for 5 periods (1,575 years) under col. V between B and C would be 5×4 35= 21 75 days.

The difference under col. VI for 3 periods of 540 years each (1,620 years) would be 12 06 days between lunar and tropical years (A and B) and 10 71 days between lunar and sidereal years (A and C) Total 22 77 days.

But under a 540 years exeligmos, as developed in col. VI, the difference due to precession or to sidereal error would be about the same (i.e , some 7 days) for any thing less than a millennium and the falling back of the tropical, with reference to the sidereal or nakshatra year may not have been perceived so early as under an exeligmos of 160 years.

APPENDIX (ii).

LUNI-SOLAR PRECESSION AS APPLIED TO INDIAN ASTRONOMY.

The year of Sūnya ayanāmśa A.D. 533 how determined (page 94, paragraph 229 of text).

The existence of the error adverted to in paragraph 217 of the Text (page 90) furnishes us with a simple means of determining, according to Sūrya Siddhānta, the year of sūnya ayanāmśa, that is, the year when the degree of precession was zero in other words, the point in the heavens at which the commencement of the tropical year coincided with that of the Sūrya Siddhānta sidereal year, or when, according to the expressions used at page 94, paragraph 229, the European and Indian celestial longitudes coincided. We know from the *Nautical Almanac* that in the year A.D. 1909, the apparent vernal equinox at Greenwich occurred on March 21 at 5·46 minutes after 6 A.M. To this time we make the addition of ·2105 of a day in order to arrive at Lanka time, so that the moment of apparent vernal equinox at Lanka was March 21·2143. The beginning of the Indian sidereal year at Lanka was on April 12·9492 according to Table II of *Indian Chronology* (2nd edition), page 258. The difference between the two moments 22·7349 days was the time taken by the Sun to advance along the ecliptic from 0° tropical longitude to 0° Indian sidereal longitude in the year A.D. 1909. We know that this time increases every year at the rate of 365·25876 days (length of Indian sidereal year) *minus* 365·24221 days (length of European tropical year) or ·016556 of a dav, roughly 1 ghaṭika per annum. Therefore the difference of 22·7349 days must have accumulated in 22·7349 ÷ ·016556 = 1373·2 years. (Roughly, we might say that $22\frac{3}{4}$ days or 1365 ghaṭikas correspond to as many lapsed years). Therefore the year of sunya ayanāmśa according to Sūrya Siddhānta was A.D. 1909 minus 1373 years = A.D. 536. There is a slight error in this method which assumes the same rate of precession in A.D. 536 as in A.D. 1909.

2. We can arrive at an exact result by another method.

The commencement of Sūrya Siddhānta year A.D. 1909 10 (vide Messrs. Sewell and Dikshit's *Indian Calendar* or author's *Indian Chronology*, 2nd edition, Table II, page 258) was on April 12·9492.

3. For Greenwich equivalent of this, we deduct ·2105 day and for interval *after* Greenwich noon we again deduct ·25 day Therefore Greenwich time corresponding to Lanka time = ·9492 *minus* ·4605 = ·4887 of a day after noon.

4. At noon at Greenwich on April 12 A. D. 1909 Sun's longitude, by Nautical Almanac, was 21°, 56′, 0·5″. Increase of Sun's longitude on 12 April A. D. 1909 was by Nautical Almanac, 147 seconds of a degree per hour.

5. Therefore for ·4887 of a day = 11·7288 hours, increase of Sun's longitude was 11·7288 × 147″ = 1724·1336″.

21°, 56′, 0·5″ = 78960″ 5 of a degree.

Total = 80684″·6336 = 22°, 24′, 44·6″ = 22·4124°.

6. This, by the Nautical Almanac, was the Sun's longitude at the commencement of the Indian sidereal year, 1909–10, *viz.*, on April 12·9492 (Lanka time) when by Sūrya Siddhānta the Sun's true sidereal longitude was exactly 0°. The difference between the two longitudes, 22·4124° must be held to have accumulated by gradual increments since the year of *sūnya ayanāmśa* or the year when the difference between the two longitudes was 0°.

7. Now the difference between the Sun's longitude, according to the Nautical Almanac, and that according to Sūrya Siddhānta arises from two causes :—

(1) The precession properly so called, the rate of which, according to Newcomb, Ball, Young and other authorities, was in A.D. 1909, 50″·2585 per annum, (= ·013961 degree), while its rate for a past year removed by an interval of **t** years from A.D. 1909 was 50″·2585 − **t** × ·000225″ per annum; or (in degrees), ·013961° — **t** × ·000000062° per annum.

(2) The excess of the length of the Indian sidereal year over the correct (modern) sidereal year, which, as stated in paragraph 217, page 90 of *Indian Chronology* (2nd edition), is ·002361 degree per annum.

8. Putting the two causes together, we may devise a useful formula for the accumulated difference Δ for any number of years **t** before A.D. 1909, between the European tropical longitude of the Sun and the Sun's Indian sidereal longitude.

$\Delta = \mathbf{t}\ (\cdot 016322^\circ - \mathbf{t} \times \cdot 000000031^\circ)$. [The 2nd **t** should, strictly speaking, be $(\mathbf{t}+1)$ but the omission of $+1$ in this case will not make a sensible difference even for 7 decimal places.]

9. Putting 1,377 years for **t**, $\Delta = 22{\cdot}4162$ degrees, which is very nearly (vide paragraph 5 supra) the difference between the European tropical and Indian sidereal longitude for the Sun on April 12·9492. We infer that the exact year of Sūnya Ayanāmśa was A.D. 1909 minus 1377 years = A.D. 532.

10. According to the formula in paragraph 8 supra the rate of precession in A.D. 532 =
$\cdot 016322^\circ - 1377 \times \cdot 000000062^\circ = \cdot 016322^\circ - \cdot 000085374^\circ = \cdot 016237^\circ$ per annum, and for any number of years **t** *before* A.D. 532, Δ or the cumulative effect of precession $= \mathbf{t}\ [\cdot 016237^\circ - (\mathbf{t}+1) \times \cdot 000000031^\circ]$

For 3000 years *before* A.D. 532, i.e. in A.D. — 2468 or B.C. 2469

$$\Delta = 3000(\cdot 016237^\circ - 3001 \times \cdot 000000031^\circ) = 3000\ (\cdot 016237^\circ - \cdot 000093031^\circ)$$

$$\begin{array}{r} -\cdot 000093 \\ \hline \cdot 016144 \end{array}$$

$= 48{\cdot}432^\circ$ exactly

For any number of years *after* A.D. 532. $\Delta = \mathbf{t}\ [\cdot 016237^\circ + (\mathbf{t}+1) \times \cdot 000000031^\circ]$

From the last expression we deduce the addition to be made to Indian sidereal longitude, in years subsequent to A.D. 532 in order to obtain the European tropical longitude.

					Quantity to be added to Indian sidereal longitude in order to obtain correct (European) tropical longitude.
∴ For A.D. 632 ...	100 years ...	Δ	= 100 ×	·016240	1·6240°
732 ...	200 ,, ...		200 ×	{·016237 + ·000006231} = 200 × ·016243/2	... 3·2486°
832 ...	300 ,, ...		300 ×	{·016237 + ·000009331} = 300 × ·016246/3	... 4·8738°
932 ...	400 ,, ...		400 ×	{·016237 + ·000012431} = 400 × ·016249/4	... 6·4997°
1032 ...	500 ,, ...		500 ×	{·016237 + ·000015531} = 500 × ·016252/5	... 8·1262°
1132 ...	600 ,, ...		600 ×	{·016237 + ·000018631} = 600 × ·016255/6	... 9·7534°
1232 ...	700 ,, ...		700 ×	{·016237 + ·000021731} = 700 × ·016258/7	... 11·3811°
1332 ...	800 ,, ...		800 ×	{·016237 + ·000024831} = 800 × ·016261/8	... 13·0094°
1432 ...	900 ,, ...		900 ×	{·016237 + ·000027931} = 900 × ·016265	... 14·6385°
1532 ...	1000 ,, ...		1000 ×	{·016237 + ·000031031} = 1000 × ·016268/0	... 16·2680°
1632 ...	1100 ,, ...		1100 ×	{·016237 + ·000034131} = 1100 × ·016271/1	... 17·8992°
1732 ...	1200 ,, ...		1200 ×	{·016237 + ·000037231} = 1200 × ·016274/2	... 19·5290°
1832 ...	1300 ,, ...		1300 ×	{·016237 + ·000040331} = 1300 × ·016277/3	... 21·1605°
1932 ...	1400 ,, ...		1400 ×	{·016237 + ·000043431} = 1400 × ·016280/4	... 22·7926°
2032 ...	1500 ,, ...		1500 ×	{·016237 + ·000046531} = 1500 × ·016283/5	... 24·4252°

APPENDIX (iii).

THE CHRONOLOGY OF EARLY TAMIL LITERATURE.

(Abridged from contributions made to St. Joseph's College Magazine, Trichinopoly.)

வான்கண் விழியா வைகறை யாமத்து
மீன்றிகழ் விசும்பின் வெண்மதி நீங்கக்
காரிருணின்ற கடைநாட் கங்குல்.

சிலப்பதிகாரம், 10-வது நாடுகாண்காதை, வரி 1-3.

TRANSLATION.

" In the dark part of the last night called *Vaigarai* (in the fortnight) following the dark fortnight, after tho moon had set, and before the sun had risen."

ஆடித் திங்கட் பேரிருட் பக்கத்
தழல்சேர் குட்டத் தட்டமி ஞான்று
வெள்ளிவாரத் தொள்ளெரி யுண்ண
வுரைசான் மதுரை யோடரைசுகே டுறுமெனு
முரையு முண்டே.

சிலப்பதிகாரம், 23-வது கட்டுரைகாதை, வரி 133-137

TRANSLATION.

" It has been foretold that Madura as well as its reigning dynasty must perish when the city is destroyed by fire on Friday, the 8th tithi in the dark fortnight, on a day of the nakshatras Bharani and Krittika in the month of Ādi (Solar month of Karkaṭaka)."

Silappadhikaram is of prime importance to the chronologist of Tamil literature for the following reasons :—

(1) It is the earliest work in extant Tamil literature, of which the commentary furnishes a clue to the exact date of its composition ;

(2) It is the earliest work in extant Tamil literature which contains a citation of a date in the style now current, *viz.*, by *tithi*, *vāra* and *nakshatra* ; and

(3) For the reason (1) above given, it is an important datum in determining the age of the Third Tamil Sangam,* and thereby the age of many of the Tamil poets known collectively as *Sangam* poets.

2. *Adiyarkunallar's* commentary on the first of the passages given in paragraph 1 supra (line 3 of canto X of *Śilappadhikāram*) may be translated as follows :—

" The month of Chittirai in that year began on a day of ' *Svāti* ' nakshtra, a third thithi (மூன்றும், third, is probably a wrong transcription, as will be presently

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*Note.—As observed on page 105 of the Text, the earliest Tamil works that have come down to us are the result of very careful compilation and redaction. To the body of scholars, critics and editors to whom we owe that redaction we should now apply the title of a Sangam, i.e., a literary court or academy but they themselves modestly declined the appellation, and they would rather have us believe that the kind of service they performed had always been normally performed for Tamil literature by a series of three sangams dating from a hoary antiquity and spread over many centuries, hundreds of poets being included in each sangam. (Commentary on *Irayanār-agap-porul*) This fiction is of no use to us, except as indicating that after the lapse of a very few centuries a Tamil work like *Tolkāppiyam* —vide page 19 of the Text,– possibly belonging only to the sixth century A.D., was apt to be regarded as dating from a hoary antiquity, perhaps because of its being a recension of earlier Tamil grammars of the same name. (*Tolkāppiyam* claims toh ave been composed in the very first age of the Tamil race, by Tolkāppiyar, one of the twelve disciples of Agastiyar, the mythical and Brahmanic founder of the Tamil language and of Tamil letters.) The reference to any work as a "Sangam" work must be understood to mean that it was one of the works recognized as standard or classical at a period (perhaps 8th to 10th century) when the general recension or redaction of such works was carried out : the dates of the works themselves must be judged independently on the evidence available.

We are able to elicit two dates respectively from *Paripādal* (A D. 634—vide page 108 of the Text) and *Śilappadhikāram* (A.D 756,—the present paper) : a third date, or something akin to a date (beginning of 6th century A.D.) has been evolved by the labours of the late Mr. Venkaiya from the Veḷvikkuḍi grant (*Madras Epigraphical Report for* 1907 1908, page 66) for Mudukkudumi Peruvaḷudi Palyāgasālai, the Pāṇḍya king in whose honour we have a few pieces in *Purananuru* and who is referred to in *Maduraikkānchi* (one of the pieces in the *Pattupāttu* anthology) as an ancestor of Neḍunjeḷiyan. From these three dates we may infer that some of the so-called sangam works were composed during a period ranging from the 6th to the 8th century A.D and to these we may add Jivāka Chintāmani which from chronological as well as other evidence we must place in 9th century A.D. (page 469 *infra*). So far only th se four dates have been evolved from early Tamil literature.

We may place Neḍunjeḷiyan of Silappadhikāram as well as his namesake of Talayālanganam fame and their contemporaries Karikāla (Chola) and Senguṭṭuvan (Chera) in 6th century A.D These three names of kings figure so often in Sangam literature and there are so many references to their ame and a hievements by evidently contemporary poets (Māngudi Maruthanār, Paraṇar, Narkirar, Kaḷāt-talayār, Kaḍiyalūr Urittirankaṇṇanār, Muḍattāmakkaṇṇiyār, etc.), that we are justified in assigning to them a period, as just stated, somewhere in 6th century A.D., on the ground that the kings in question were the centre of the main literary cycle in Sangam literature, just as Arthur and Charlemagne were in Western romance. Senguṭṭuvan with whom we are chiefly

shown, for ஒன்றும், first); Sunday. On the 28th day of that Chittirai, which was a Saturday, when full moon joined with nakshatra '*Chitrā*', the flag (of Indra) was hoisted; the festival went on for 'four times seven days,' that is for twenty eight days; then the flag was taken down; then on *Monday*, the 28th day of Vaigāsi, the *thirteenth day* of the first lunar fortnight and a day of 'Anurādhā' nakshatra, there was a general bath in the sea, at which the lovers quarrelled; then on the 29th day of Vaigāsi which was a *Nāsa Yoga*, or destructive combination, of Tuesday, with 'Jyeshtha' nakshatra, on the last night of the waxing moon before it was full, in the portion of the early dawn, called *vaigarai*, after the setting of the moon, when it was quite dark [the hero and heroine left the paternal abode in *Kāvirippattinam*]."

3. At this stage it may be well for us to recall briefly the story of *Śilappadhikāram*, so as to be able to understand the bearing of the dates on the rest of the story.

Kōvalan, the son of a rich merchant of Kāvirippattinam, the maritime capital of the Cholas, had wasted all his substance, like a prodigal son, on an actress called Mādhavi, deserting his faithful and loving wife Kannaki. On one occasion, according to their yearly custom, Kōvalan and Mādhavi went to the beach to watch, from their gilded canopy, the sea-bathing festival which brought to a close the 28 days' celebration in honour of Indra. The festival began, we are told, on a Saturday near the full moon at the end of Chittirai (this year, the commentator tells us, the first Saturday of the festival was the 28th of Chittirai) and was kept up for four weeks: on the Sunday following the last Saturday of the feast, the flag was taken down, and on Monday the people went to bathe in the sea. On the present occasion Kōvalan sang to the accompaniment of his lute a song as though he were pining for an absent love. Presently Mādhavi took the lute from him and sang in turn a similar song. Kōvalan was stung to the quick by the actress' behaviour and left her abruptly. In vain she implored him to return, but the commentator tells us that the next day, Tuesday, the 29th day of Vaigāsi, was a bad day for parted friendships, the nakshatra being 'Jyeshtha' (the proverb செவ்வாயும் கேட்டையும் சேர்ந்தாற்போல் is still current in Tamil). Kōvalan, instead of returning to the actress, returned in the evening of the Monday to his own wife

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concerned in Silappadhikāram is the hero of the fifth canto of Padirruppattu and the poet Paranar has there sung his praises.

This particular literary cycle appears to have been celebrated by the Tamil poets, as a sort of golden age of Tamil literature, long after the kings themselves and their generation had passed away, and in this assumption will probably be found the real explanation of a good deal that has puzzled critics in regard to *Śilappadhikaram* and *Manimēkhalai*. These two poems are centred round the Kōvalan-Kannaki legend which, from the antiquity of Pattini worship in Ceylon, we may perhaps date from the second or third century A.D. so far as that island is concerned, but which in India is perhaps not older than the seventh century A.D., since it first appears there as a *reminiscence* of the golden age, rather than as an episode falling within the *time-limits* of that age. The legend was probably associated from the first with Madura and the Pāndyans, but we need not wonder that so attractive a legend, with so much of the supernatural woven into it, was linked, as a next step, with the Cholas, it apparently remained for poets of the 7th and 8th centuries A.D. to connect it further with the Chera king Senguttuvan, by depicting Kannaki, as journeying (somewhat as Orpheus did after the death of Eurydice), for fourteen days without food and drink, due west, to seek her end in the mountains of the Chera kingdom, and as having been there immortalized by Ilangō-adigal, a prince of the Chera line. To the eighth century poet, Senguttuvan of the sixth century A.D. was as legendary a figure as Gajabāhu of the second: and by an anachronism which will not surprise any one who knows how legends shape themselves, he brings Gajabāhu into the court of Senguttuvan; and further, being a dramatist (Śilappadhikāram, teeming as it does, with action songs and choruses by actors and actresses, is throughout dramatic in conception), he also brings in the supposed author Ilangō-adigal, as a sort of Prospero, a character in this own drama addressing the audience in the first person, along with his friend Sāttanār,—a wholly unnecessary procedure unless the object was to sustain the identity of a feigned authorship. The fiction of writing a romantic poem under the pen-name of Ilangō-adigal was cleverly conceived, and it was probably thoroughly appreciated by the eighth century Tamil audience as a happy reminiscence of the Senguttuvan cycle and the golden age. Sittalai Sāttanār, in his Manimekhalai, does not introduce himself into the legend, as does the author of Śilappadhikāram, and Sāttanār was probably a real historical critic and poet of the seventh century A.D. who used the Senguttuvan cycle and the Kannaki legend, which evidently had attained full growth before his time; but owing to the utter absence of a literary chronology in Tamil there was nothing unusual in his being associated in the imagination of an eighth century poet with Ilangō-adigal, as the latter's contemporary. The Nedunjeliyan of Śilappadhikāram is believed by some writers to have reigned somewhat earlier than Nedunjeliyan of Talayālanganam fame, since each seems to have a different title in *Puranānūru*, but the former is a somewhat shadowy character who is merely introduced in one canto of the poem in order to be got rid of in the next, and poets who lived in subsequent centuries may well have used the name merely to connect it with the golden age. Karikālan, though better known to us through poems in his honour, is himself but faintly delineated in Manimēkhalai, and Senguttuvan is the only name of a king standing out in bold relief in both the poems.

Apart from chronological indications, it is apparent from the *patikam* or poetical summary prefixed to Śilappadhikāram that Manimekhalai was written first and Śilappadhikāram afterwards in order to complete it, and while it is apparent that the authors of Śilappadhikāram and Manimēkhalai worked upon previously existing materials, we may take it that the main details of the Kannaki-Kōvalan legend were not familiarly known to the Tamil people for more than about a hundred years before the earlier of these works was written; and that is why, in all probability it was associated in Tamil literature with the golden age of Chenguttuvan Karikala and the greater Nedunjeliyan, though in Ceylon it had apparently been current for a longer time, and it is not impossible that the legend dates, so far as that island is concerned, from the epoch of Gajabāru (2nd century A.D.).

Kaṇṇaki, who sat moaning and pining for him, and surprised her with an invitation to proceed with him to Madura where he hoped to sell one of her anklets, his last bit of property but a valuable item, and rehabilitate his fortunes by trading on this capital. She readily complied, and they left their home secretly before the dawn of Tuesday and while it was yet quite dark, the moon near full having set; (we are told it was the *fourteenth* tithi of the bright fortnight, and we shall see presently how it was possible for the same day, Monday, to be the 13th tithi in the morning, as stated by the commentator in the passage translated *supra*, and the 14th at night, as mentioned expressly in the text of the poem quoted at the head of this article). Madura, the Pāṇḍya capital, was a long way off, but the pair had good company in the person of Kavunti, an aged female Jain ascetic who entertained them with stories all along the way. Leaving Kāvirippaṭṭinam, let us say, early morning on Tuesday, 17th May (it was not yet quite the beginning of Tuesday according to Indian reckoning, because Tuesday's sun had not yet risen), they arrived in Madura on or about the 20th July of the same year. Kōvalan left his wife to be cared for by a shepherdess called Mādhavi and by Kavunti and went into the city to sell the anklet (Tamil, *silambu*). Presently he met a company of goldsmiths, headed by the King's own goldsmith, and he offered them his *silambu*. Now the King's goldsmith had been recently charged with stealing his royal mistress' gold anklet, and he thought this a good opportunity to turn the suspicion against the poor stranger. He therefore ran to the palace and informed the Pāṇḍya that the man who had stolen the queen's anklet had been found : whereupon the Pāṇḍya, although not a tyrant, ordered his soldiers to behead the thief if indeed he was such. Without much ceremony and without any trial, poor Kōvalan's head was cut off by an executioner, whose excuse was that, if the offender was not cut down at once, he might effect his escape by magic. The terrible news reached Kaṇṇaki's ears. She rushed to the spot where her dead husband lay, and after her first wail, took an oath that she would be revenged for the unjust execution of her husband. At the same moment a voice in the air proclaimed that the city was doomed to destruction by fire. Kaṇṇaki ran to the Pāṇḍya and poured forth her wrath in his presence, easily proving her husband's innocence, because the queen's other anklet was filled with pearls, whereas her own other anklet, which she broke in the Pāṇḍya's presence, was filled with diamonds. The Pāṇḍya was so shocked by his single act of injustice that he swooned to death and his wife died immediately after on account of grief : presently, the city took fire simultaneously on all sides, and although the goddess of Madura appeared in person before Kaṇṇaki and pleaded for the city which, she owned, had been already doomed to destruction by an old oracle on "*Friday, krishna ashtami, the day of Bharaṇi and Krittikā, in the month of Ādi*" the wrathful Kaṇṇaki, bent on revenge, would not relent, and pronouning her curse on the city, withdrew from it to the adjoining forest of the Chera king : in this forest on the 14th day, she was seen by the shepherds taking her flight to *swarga* with her husband. The Chera king had a costly temple and statue erected in her honor : the Chola and Pāṇḍya did the same : and so did Gajabāhu, King of Ceylon "girt by the sea."

4. Although the poem itself does not give any other detail as to the time of flight of Kōvalan and Kaṇṇaki from the Chola capital, than that it took place on the last day of a bright fortnight, after the moon had set, when it was quite dark, day not having dawned, the commentator Aḍiyārkunallār (who may have lived in the 11th or 12th century A.D.) confidently supplies other details, viz., that it was the night between Monday and Tuesday, which was a day of "Jyeshṭha" nakshatra and the 29th day of Vaikāśi. He adds that as the festival of Indra began that year on Saturday 28th Chittirai, the 1st Chittirai must have been a Sunday; also that the 1st day of Chittirai was a day of "Svāti" nakshatra. Lastly, it is inferrible from these statements that the month of Chittirai, which usually contains 31 days, had only 30 days in this particular year. The investigation will turn naturally on the answers to the following questions :—

(1) How often between A.D. 1 and A.D. 1900 was the month of Chittira limited to 30 days?

(2) Out of the number of years furnishing an answer to (1), how many years had Chittirai beginning on a Sunday?

(3) Out of the number of years answering question (2), how many had the thirteenth tithi in a bright fortnight combining with nakshtra "Anurādhā" on a Monday?

5. The answer to question (3) which is also the solution of our problem, is that between A.D. 1 and A.D. 1900 there was only one year, one month, and one day, satisfying all the conditions, and that was Monday, 17 May, A.D. 756, on which day, as will be seen from Vol. I, Part II, of this Ephemeris, the thirteenth tithi in the bright fortnight of Lunar Jyeshṭha month combined with nakshatra "Anurādhā," the tithi ending at 3½ ghaṭikas after sunrise, and the nakshatra being current all Monday and coming to an end at 8 ghaṭikas after sunrise on Tuesday. *Jyeshṭha* nakshatra, the next after "Anurādhā" was of course current for practically the whole of Tuesday and it came to end an hour after sunrise on Wednesday. On the day when Kaṇṇaki and Kōvalan left their home on their fateful flight, the unlucky *Jyeshṭha*, so the astrologers thought, exerted its influence in conjunction with *Tuesday*. According to Garga, but not according to Brahma Siddhānta nakshatra Jyeshṭha would have begun 12 ghaṭikas earlier, i.e., just as the couple were leaving home.

6. The reader may ask: How came it that, in the general dearth of historical records, this unique date was preserved from the year A.D. 756 when the events are supposed to have occurred, until the year, some centuries later, when the commentator wrote? The particular astrological combination of Tuesday with nakshatra Jyeshṭha occurs, we may suppose, at least once in every twelve months, but the facts, that (1) the combination occurred in Kōvalan's case on the Tuesday after the conclusion of the Indra festival, which in that particular year came to an end on 28th Vaikāśi, and (2) that Chittirai in the same year began on a Sunday and ended on a Monday, were not unlikely to have been recorded in the earliest commentaries on the poem. To render this possible, we have only to assume that it was a well understood rule that the festival should begin on a Saturday as near as possible both to the full moon and to the 28th day of Chittirai. It is undeniable that a very few curious and unique dates like this are to be found here and there in Tamil literature, howsoever they may have been preserved. One thing is practically certain: it would have required an extraordinary effort to calculate all the details of date for an imaginary occurrence, and our Tamil authors do not appear to have performed such exercises in calculation, if indeed they were capable of executing them. After all, they do not seem to have cared for the dates, *as dates*, because they invariably omit the *years*. They gave the details, partly because the latter were astrologically interesting, and partly because what was not astrological had somehow always formed part of the record. If they cared to invent, they could have invented a date near their own time or taken it out of current panchangas.

7. We have yet to furnish the curious reader with the method by which a problem of this kind is worked out so as to yield a satisfactory solution. First of all, a table like Table II of *Indian Chronology*, 2nd Edn., pp. 200 to 279, is necessary for its solution.

8. Given Table II, how are we to find the years in which Chittirai had only 30 days? Remembering the rule that Chittirai begins on the day of Mēsha sankrānti, if that sankrānti occurs at or before ·50 of a day, but that otherwise Chittirai begins on the next day (p. 30 of the text) and that Vaikāśi follows the same rule with reference to Ṛishaba sankrānti, we easily deduce the corollary that ***Chittirai will have only 30 days if Mēsha sankrānti occurs between ·51 and ·58 of the day.*** In addition, in order that the 28th Vaikāśi may be a day of "Anurādhā," or, which is the same thing, in order that the first of Chittirai may be a day of "Svāti," it is necessary that the first new moon in the solar year should occur, according to Table II about 14·75 days after Mēsha sankrānti, not much earlier nor much later.

9. The following are the only years between A.D. 1 and A.D. 1900 in which Chittirai had only 30 days and in which it was possible for Chittirai 1 to be a day of "Svāti":—

A.D.	Occurrence of Mēsha sankrānti.		Interval in days between Mēsha sankrānti and 1st new moon in solar year.	Remarks.
	Sūr. Sid.	Āry. Sid.		
	March.	*March.*	*Days.*	
203	16·51	16·53	13·78	1st Chittirai was *Thursday.*
211	16·58	16·60	15·23	1st Chittirai was *Sunday* but 28 Vaikāśi was Tuesday, 14th May; and Jyeshṭha Sukḷa 13 was Monday 13 May.
230	16·50	16·52	15·01	1st Chittirai was *Wednesday* by Ārya, Sid.
466	18·56	18·57	13·72	" *Saturday* Jyesh. Sukḷa 13 was Sat. 14 May; while 28 Vaikāśi was 15 May
485	18·48	18·48	13·50	1st Chittirai was *Monday.*
493	18·55	18·55	14·95	" *Friday.*
729	20·6166	20·5990	13·68	" *Monday.*
748	20·53	20·51	13·46	" *Thursday.*
756	20·6030	20·5833	14·92	" *Sunday.* (This is the year answering our problem.)
775	21·5194	21·4913	14·69	" *Wednesday.*
802	21·50	21·48	15·93	" *Wednesday.*
1011	23·59	23·55	13·40	" *Saturday.*
1030	23·50	23·46	13·17	" *Monday* by Ārya Sid. and Tue. by Sūr. Sid.
1038	20·53	20·57	14·63	1st Chittirai was *Friday.*
1066	23·56	23·52	15·86	" *Saturday.*
1301	25·6253	25·5642	14·58	By Ārya Siddhānta 1st Chittirai was *Sunday*; but Jyeshṭha Sukḷa 13 ended on Sunday, May 21·25.
1320	25·54	25·48	14·35	1st Chittirai was *Wednesday.*
1347	26·53	26·49	15·58	" *Tuesday.*
1583	28·59	28·55	14·30	" *Friday.*
1591	28·66	28·58	15·76	" *Monday.*
1602	28·51	28·47	14·07	" *Sunday* by Ārya Sid. and Monday by Sūrya Sid: but the Ārya Sid. Chittirai had 31 days, not 30 only, as required.
1610	28·58	28·50	15·53	1st Chittirai was *Thursday.*
1846	Ap. 11·65	11·55	14·25	" *Sunday* and Chittirai had only 30 days; but Jyeshṭha Sukḷa 13 and "Anurādha" nakshatra ended on Sunday, June 7·71 and Monday June 8·85 respectively so that Monday was not 13th tithi.

10. In this investigation we have to remember that the Ārya Sidhānta sankrāntis which are followed in Southern India are not the same as the Sūrya Siddhānta sankrāntis. The following table shows by what interval the Ārya Siddhānta sankrānti followed or preceded the Sūrya Siddhānta sankrānti. It also shows us that up to A.D. 500 the Sūrya Siddhānta sankrānti was earlier than the Ārya Siddhānta sankrānti and that after A.D. 600 the former occurred later than the latter.

Table showing the interval (fraction of a day) to be added to or deducted from the moment of sankrānti by Sūrya Siddhānta to obtain the corresponding moment by Ārya Siddhānta :—

A.D. 1	+ ·04		A.D. 1000	− ·04
A.D. 100	+ ·03		A.D. 1100	− ·04
A.D. 200	+ 02		A.D. 1200	− ·05
A.D. 300	+ ·01		A.D. 1300	− ·06
A.D. 400	+ ·01		A.D. 1400	− ·07
A.D. 500	+ ·00		A.D. 1500	− ·08
A.D. 600	− ·01		A.D. 1600	− ·08
A.D. 700	− ·02		A.D. 1700	− ·09
A.D. 800	− ·02		A.D. 1800	− ·10
A.D. 900	− ·03		A.D. 1900	− ·11

11. We have also to remember that by Ārya Siddhānta only 30·92 days have to be added to the moment of Mēsha sankrānti in order to obtain the moment of Ṛishabha sankrānti (*vide* Table II of *Indian Chronology*), p. 182, whereas the corresponding addition by Sūrya Siddhānta is 30·93 days. We shall see presently how this fact affects the problem.

12. We see that the test whether Chittirai 1 of any year in the above list was a Sunday is enough to dismiss all the years in which Chittirai had 30 days and coincided with "Svāti" nakshatra, with the exception of 4 years, viz., A.D. 211,

A.D. 756, A.D. 1301 and A.D. 1846. In all the other years 1 Chittirai was not Sunday. In A.D. 1602 the 1st Chittirai was Sunday by Ārya Siddhānta and Monday by Sūrya Siddhānta but the Ārya Siddhānta Chittirai had 31 days, not 30 days only as required. We give this only as a sample of many other cases that we must reject *in limine* as cases in which Mēsha saṅkrānti did not occur between the limits required, namely between ·51 and ·58 of the day.

13. We see that the years A.D. 211, 756, 1301, 1846 occurred at regular intervals of 545 years. This is important as indicating that years such as the one we are in search of, can occur *only* once in 545 years. (If we had only to deal with solar day of month, vara, tithi and nakshatra, the cycle would be 423, 301, 122, or 101 years: the present cycle is really a compound of two cycles of 423 and 122 years.)

The curious reader who has the patience to make the necessary calculations from "Indian Chronology" will find similar dates in A.D. 211 *minus* 545 years, that is in 335 B.C., and 545 years later than A.D. 1846, i.e., in A.D. 2391.

But there is one year, and one only, throughout the period with which we are concerned which satisfies all our conditions, and that is the year A.D. 756. Only two other dates, A.D. 211 and A.D. 1301, *seem* at first sight to offer possible alternatives, but neither of these will satisfy *all* the conditions arising out of the problem.

14. The objection to A.D. 211 is that in that year, Tuesday, the day of flight, was, by Sūrya Siddhānta and *a fortiori* by Ārya Siddhānta, 28th Vaikāsi only and not 29th Vaikāśi, as the commentator says it was, judging by the duration of the Indra festival. It is a much more serious objection to A.D. 211 that in that year the 15th tithi ended on Wednesday, at 24 ghaṭikas after sunrise and that in the night between Tuesday and Wednesday which was the last night of the bright fortnight, the moon could have set only 20 minutes before mean sunrise (6 a.m. local time). It could not have been dark then. We know that the flight took place in the last night of the bright fortnight, after the moon had set, and *when it was quite dark*, the night being one *between Monday and Tuesday*. The conditions italicized were not fulfilled in A.D. 211.

15. Nor were they fulfilled in A.D. 1301, although they came nearer to fulfilment in that year than in A.D. 211. In A.D. 1301, *Sunday*, the first of Chittirai, was a day of "Svāti" nakshatra which ended at ·79 the same day: it was bahula 1 (as in A.D. 756), not bahula 3, which, as shown below, is either an error or an erroneous reading in the commentary. In A.D. 1301, *Saturday*, the first day of the Indra festival, 28th Chittirai (= 22 April), a day of "Chitra" nakshatra (·06) and very near full moon; for, full moon tithi commenced at ·73 on that day, ending next day (Sunday) at ·75. In A.D. 1301, again, *Tuesday*, the day of flight, was 29 Vaikāśi (= 23 May), as required, and the night between Monday and Tuesday was the last night in the bright fortnight in which the moon set; (though it must have set only about a quarter of an hour before mean sunrise, and it could not have been dark at 5-45 a.m. in May). On Tuesday, 23 May, A.D. 1301, full moon tithi ended at ·33 and "Jyeshṭha" nakshatra at ·63 of the day. On *Monday* 22 May, A.D. 1301, Sukḷa 14 ended at ·28; and as Sukḷa 13 had ended on *Sunday*, 21 May at ·22, *the commentator's statement that Sukḷa 13 was current on Monday morning was not fulfilled in A.D. 1301.*

16. We are left with a single year (A.D. 756) in the whole range of 2,000 years, which it is possible for us to examine with the help of Table II in *Indian Chronology*; and this year alone satisfies the given conditions. In that year Chittirai began on Sunday, on a day of "Svāti" nakshatra, in the sense that on that day nakshatra "Svāti" began at 38 ghaṭikas after sunrise, ending at 35½ ghaṭikas after sunrise the next day. Ordinarily, such a day would be called a day of "Chitrā" nakshatra, but the nakshatra noted by the commentator appears to have been obtained by backward calculation from "Jyeshṭha," the nakshatra, under whose influence, combining with that of Tuesday, Kōvalaṉ and Kaṇṇaki left their home in Kāviripaṭṭinam. In the same way, the tithi of Sunday the first Chittirai is noted as 3rd tithi, whereas it is evident that 57 days later, the tithi

must have been at least 58 tithis forward, i.e., at least *bahula* 1 (supposing Chittirai 1 was *bahula* 3). Now we know that 57 days afterwards, i.e., on the Monday of the sea-bathing, the tithi was the 13th of the bright fortnight, and therefore the tithi on the 1st of the previous Chittirai could not have been earlier than the 15th of the bright fortnight. In other words, between a 3rd tithi in one dark fortnight and a 13th tithi in the bright fortnight of the next but one lunar month the interval cannot be more than 55 days, whereas the actual interval in this case was 57 days. On the 1st day of Chittirai in A.D. 756, full moon ended at 12½ ghaṭikas after sunrise and at the same moment the 1st tithi or *prathamai* of the dark fortnight commenced. On the whole we may conclude rather that the reading மூன்றாம் பக்கம் is a mistake for ஒன்றாம் பக்கம், "the 1st tithi in the dark fortnight," than that the date "third tithi" was arrived at by retrospective or any other calculation.

17. Lower down, the commentator Adiyarkunallar notes that the 28th day of Chittirai in that year was Saturday, a day of "Chitrā" nakshatra and full moon. We find that in A.D. 756 in the month of Chittirai, the full moon tithi commenced (i.e., the 14th tithi ended) at 41½ ghaṭikas after sunrise on Sunday 18th April, while nakshatra "Chitrā" ended about sunrise on the same day; so that Saturday 17th April A.D. 756, which was the 28th day of Chittirai combined with nakshatra "Chitrā" and the fourteenth tithi or the tithi previous to full moon: the 14th tithi, however, commenced so late on Saturday that, properly speaking, Saturday, the 28th Chittirai, should have been described as the day of the tithi which was current at its sunrise, viz., the 13th tithi. Tamil writers seem occasionally to speak of a day as combining with full moon in the sense that it was very near full moon. In this particular case there was perhaps special justification for this loose manner of writing. A festival occurring in a particular month must to a certain extent be moveable if it is tied not only to a day of the month, but also, and simultaneously, to a week-day, a tithi and a nakshatra. In this case, there is reason to believe that the festival of Indra was so tied. It was apparently proclaimed by the flag being "up" (as stated by the commentator) for five Saturdays and the four intervening seven-day weeks, the first Saturday of the festival being so selected as to be near a full moon and also near the end of the Tamil month of Chittirai. On this supposition, the festival might happen to begin on a Saturday which was six days removed from the full moon, and nevertheless it might be permissible to refer to it as a Saturday fixed *in conjunction with* the full moon.

18. Another instance of a moveable festival in the sense just explained is to be found in the Kāman (Cupid) festival referred to in lines 5, 6 of canto 6 of *Silappadhikāram*, Kadalāḍukatai. Here the commentary refers to the 29th day of Pañguni (preceding the Chittirai of our story) and says that 29 Pañguni as well as "Chitrā" nakshatra was "fixed for the end of the festival."

Now we have already seen that the 1st day of Chittirai in the year of our story was itself a day of "Chitrā" nakshatra, and therefore 29 Pañguni must have been day of "Pūrva Phalgunī" because when Chittirai has only 30 days, the previous month Pañguni would have 31 days. The commentator could not have been unaware of this fact: and therefore, when he says that the Kāman festival "closed on 29 Pañguni, a day of Chitrā nakshatra," he must be taken to mean that the festival was so regulated that its end might coincide, *normally* and *as nearly as possible*, with the 29th day of Pañguni and "Chitrā" nakshatra.

19. We now come to the actual day of departure of Kōvalan and Kaṇṇaki from Kāviripaṭṭinam. The commentator says that they left on *Tuesday, 29th Vaikāśi, a day of nakshatra "Jyeshtha," and the fourteenth tithi in the bright fortnight, after the moon had set, and before sunrise*. One is inclined to suppose from this statement that they left in the night between Tuesday and Wednesday, and before the Wednesday's sun rose; both the text of the poem and astronomical calculation lead us to the conclusion that they left in the night between *Monday* and *Tuesday*, in what we should call in English the small hours of the morning on Tuesday. In ordinary Hindu usage, a day does not begin till sunrise; and the interval from sunrise on Monday to sunrise on Tuesday, including what we should

call the small hours of the morning on Tuesday, would be called Monday. If therefore, we took in its literal and ordinary sense the commentator's statement that the couple left on *Tuesday*, then, knowing that according to the text of the poem they left "before sunrise and after the moon had set," we should be driven to conclude that they left in the night between Tuesday and Wednesday.

20. Canto IX of *Silappadhikāram*, however, leaves us no option but to conclude that, in the evening of the *Monday* when Kōvalan abandoned Mādhavi, the latter sent him a note pressing him to return, that the messenger met Kōvalan near the market, that Kōvalan would not look at the message and spurned it as well as the sender, and that he went in the same evening after nightfall to the private apartments of his wife Kaṇnaki and induced her to leave home with him *early next morning*. Therefore they must have left in the small hours of the morning *before the sun rose on Tuesday*: and the astrological condemnation of the day of their departure as a day of "Jyeshṭha" combining with Tuesday, must be referred to Tuesday, as the day which rose *on the first day of their journey*, rather than to Tuesday as the civil day at the close of which they commenced that journey.

21. Astronomical considerations lead us to the same conclusion. The 13th tithi of the bright fortnight, which coincided with Monday, 28th Vaikāśi, came to an end at 3½ ghaṭikas after sunrise on Monday 17th May, A.D. 756. The 14th tithi began at the same moment and ended at 58 ghaṭikas after sunrise, i.e., at what we should call 5 a.m. on Tuesday. The next tithi, the 15th or full moon, came to end on Tuesday night at 51½ ghaṭikas after sunrise, i.e., at what we should call 3 a.m. on Wednesday. [There was an eclipse at this full moon, but it need not concern us, as neither text nor commentary refers to that phenomenon.]

22. All night between Tuesday and Wednesday, there was a full moon (except for the eclipse), and the express reference in the text to the *brief interval of darkness* between the setting of the moon and the breaking of day on the last tithi of the bright fortnight, would oblige us, even if the 14th tithi had been current on Tuesday, just as the 13th tithi was current on Monday, to conclude that the couple left their home *in the night between Monday and Tuesday*, not in the night between Tuesday and Wednesday.

23. But the story requires (and this also is a very unusual condition, which, together with the other conditions stated above, is satisfied by A.D. 756) a Monday in the *morning* of which the 13th tithi of the bright fortnight was current, and *at the end* of which the 14th tithi was not only current *but had come to an end*; for, if the 14th tithi had been one that came to end by day on Tuesday (as it did in A.D. 211), then the 15th tithi or full moon would have come to end by day on Wednesday and the night between Tuesday and Wednesday would have been the last night of the waxing moon when it would be possible for the moon to set, whereas we understand from the story as unfolded in the text and commentary, that the night between Monday and Tuesday was the *last* of the waxing moon *before* it was full. (The commentator was evidently not unware of the fact that the 14th tithi was *Kshaya*, i.e., that it began and ended between one sunrise and the next; in fact, this is implied in his statement that Monday morning was the 13th tithi and Monday night was the 14th and that the same Monday night was the last night in which the moon set during the bright fortnight.)

24. The apparently meagre details given partly in the text and partly in the commentary of *Silappadhikāram* suffice to lead us *almost* infallibly to the date intended by the author as well as the commentator, viz., A.D. 756. We say "*almost* infallibly," because we have had so far to assume, for the correct solution of the problem, that the Ṛishaba sankrānti in A.D. 756 fell not later than mean sunset, i.e., on March 20·58+30·93= March 51·50 = April 20·50. [The figure ·50 means at ·50 of a day of 24 hours or at 30 ghaṭikās counted from sunrise.]

25. The actual moment of Ṛishabha sankrānti, according to the first Ārya Siddhānta was, however, in A.D. 756 (as will be seen from Tables I and II of *Indian Chronology*), March 20·5833+30·9250 = March 51·5083 = 30 ghaṭikās, 30 palas (= 12 minutes) after mean *sunrise* on 20th April A.D. 756; in other words, the sankrānti was later than mean *sunset* by 30 palas or 12 minutes. Now the rule in

Southern India (p. 4 of the text) is that if sankrānti occurs *before* sunset, the civil month begins *on the same day*, and that otherwise the civil month begins on the next day. Nowadays almanac-makers probably do not consider the actual moment of sunset in working this rule, since they seem always to postpone the beginning of the civil month when the sankrānti falls after 30 ghaṭikās from *mean* local sunrise, i.e., from 6 a.m. (mean local time). It is just possible, however, that in former times they may have considered the sankrānti with reference to the *actual* moment of sunset. If they did this in A.D. 756, then the moment of sunset on the 31st day of the solar year in lat. 11° (Tanjore, which is fairly near the site of Kāvirippaṭṭinam, the ancient Chōla capital), must have occurred 6 minutes or 15 palas after mean sunset 6 p.m. (see art. 80 of *Indian Chronology*). This fact, however, would not by itself account for the non-postponement of the beginning of the civil month because the moment of Ṛishabha sankrānti would still be 6 minutes or 15 palas latter than actual sunset. But in fact we have to apply, not the present rules as to local sunrise and sunset which are based on the *Siddhānta Śirōmaṇi* (A.D. 1150), but the rules which were in force before that work was published by Bhāskarachārya. The effect of those rules is stated in section 62 of Prof. Jacobi's article at page 436 of *Epigraphia Indica*, Volume I, and in accordance with the ancient practice as there stated, we have to add the *chara*, i.e., 130 *asus* or 130 × 4 = 520 seconds = nearly 9 minutes of time, to the moment already obtained (6·6′ p.m.) in order to obtain the actual moment of sunset, as it was probably computed by the almanac maker at Tanjore in the year A.D. 756. With this addition we find that the Ṛishabha sankrānti would in that year have occurred about 3 minutes *before* actual sunset, so that the month Ṛishabha or Vaikāśi would have begun *on the day* of sankrānti, and Chittirai would have been a month with only 30 days, and our problem would be fully satisfied in every respect.

26. Incidentally, the present case shows that, in verifying solar month dates of this period, we should take into consideration, not only the First Ārya Siddhānta and the actual moment of sunset, but also the rule stated by Bhāskarāchārya as to the ancient practice in calculating the local time of sunrise and sunset.

27. **The full date with vara, tithi and nakshatra, in Silappadhikāram.**—Perhaps the most interesting passage in *Silappadhikāram* from a chronologist's point of view is the second one quoted at the head of this paper. "There is a prophecy that in the month of Āḍi, in the dark fortnight, on a day of 'Bharaṇi' and 'Kṛittikā' nakshatras, on the 8th tithi, on a *Friday*, Maḍura must be destroyed by fire and the royal line of kings come to an end." In the first place, the clear reference to a week-day postpones the date of composition of the poem (in the present state of our knowledge) to a period subsequent, at any rate not anterior, to the 5th century A.D.—vide page 15 of the text. Secondly, the details of tithi, vāra and nakshatra given in this passage enable us to satisfy ourselves whether the date arrived at by us on the strength of earlier passages in the poem and the commentary thereon is borne out, or whether there is still a chance for either of the competing dates A.D. 211 and 1301. Our object in examining dates in A.D. 1301 is to meet a possible view that, supposing this was the epoch of the commentator Aḍiyārkunallār, he may have based his comments on a *contemporary* date similar in all respects to that mentioned in the poem but obtained from a *panchanga* of his own time (*cf.* remarks ont he Ālvār dates, paper vi, p. 487 below).

28. On Friday 23 July A.D. *756, which was the last day of the Tamil month Āḍi, Śrāvaṇa (lunar month) *bahula* 7 (= 7th tithi in the dark fortnight) ended, and the 8th tithi in the dark fortnight began, at 21 ghaṭikās after mean sunrise, i.e., at or about 2-30 p.m.; while nakshatra "Bharaṇi" ended, and nakshatra "Kṛittikā" began, 6 ghaṭikās after mean sunset, which divides the Indian civil day into equal halves. According to Brahma and Garga, Bharaṇi would have come to end 30 ghaṭikās earlier, i.e., 6 ghaṭikās after sunrise. The nakshatra is indicated in Tamil by the words அழல் சேர் குட்டத்து meaning Kṛittikā nakshatrā. But the commentator on *Silappadhikāram*, called அரும்பதவுரை யாசிரியர் (i.e., "the author of the glossary"), interprets அழல் சேர் குட்டம் by "*Kṛittikā Bharaṇi*," more, we may suppose, out of regard for facts than in view of the literal meaning of the words.

* Ephemeris, Vol. I, part II, A.D. 700 to A.D., 799.

The nakshatra of a day is, properly speaking, the nakshatra current at sunrise, which, in this case, was *Bharaṇi*: but Kṛittikā is the nakshatra of fire (Tamil அழல் = fire), thence the prophecy that Madura was destined to be destroyed by fire on a day of "Kṛittikā"; but inasmuch as it was more properly a day of "Bharaṇi," the commentator has thought fit to mention this fact. Madura was probably burnt in the night when "Kṛittikā" nakshatra was current.

29. So far, the year A.D. 756, for the *res gestæ* of the poem, tallies exactly with the second as well as the first date which we have had to investigate in order to determine the date of its composition. We have now to see whether A.D. 211 or A.D. 1301 which, we found, would not satisfy the first date would answer at least the second.

30. In A.D. 211 the tithi Śrāvaṇa (lunar month) *bahula saptami* ended, and *ashtami* began, at 47½ ghaṭikās after sunrise, i.e., about 1 a.m. in the night between Friday and Saturday, the Friday being 19th July, the last day of the month of Āḍi. Nakshatra "Bharaṇi" ended about sunrise on Saturday 20th July, the 1st of Āvani. We have here three objections to accepting A.D. 211 as a likely date. In the first place, the tithi was *saptami*, not ashtami at the time when the town began to be ablaze, i.e., in the night between Friday and Saturday; in the second place, the nakshatra was *Bharaṇi* not *Kṛittikā* (அழல் சேர் குட்டம்) at all: and thirdly, the nakshatra Kṛittikā was current on Saturday, 1st of *Āvani*, and not on Friday in *Āḍi*. We have already seen that A.D. 211 will not suit also the day of departure of Kōvalan and Kaṇṇaki from Kāviripaṭṭinam.

31. Nor could the commentator have had in mind A.D. 1301 as a year similar in all respects to the year when Madura was burnt. In A.D. 1301, Śrāvana (lunar month) *bahula saptami* ended, and *ashtami* began, at 35½ ghaṭikās after mean sunrise, i.e., about 8 p.m., while nakshatra "Bharaṇi" ended, and nakshatra "Kṛittikā" began, at 48½ ghaṭikās after mean sunrise, i.e., about 1-30 a.m., in the night between Friday and Saturday. The Friday was 28th July, the last day of Āḍi. Here again Friday 28th July could not have been referred to as "Kṛittikā" unless the fire happened after 1-30 a.m.

32. The Madras Epigraphists have gradually come to adopt the view presented in this paper, though on quite different grounds. In his *South Indian Inscriptions*, Volume II, part III, page 378 (1895), Dr. E. Hultzsch wrote: "In one of his interesting contributions to the history of ancient Tamil Literature, the Hon'ble P. Kumāraswāmi allots Karikāla to the first century A.D. This opinion is based on the fact that the commentators on the *Silappadhikāram* represent Karikāla as the maternal grandfather of the Chēra king Senguttuvan, a contemporary of Gajabāhu of Ceylon. Mr. Kumāraswāmi identifies the latter with Gajabāhu I who, according to the *Mahāvamso*, reigned from A.D. 113 to A.D. 135. With due respect to Mr. Kumāraswāmi's sagacity, I am not prepared to accept this view, unless the identity of the two Gajabāhus is not only supported by the mere identity of the name, but proved by internal reasons, and until the chronology of the earlier history of Ceylon has been subjected to a critical examination."

33. Twelve years later, at page 66 of his annual report for 1906-07, the Madras Epigraphist, the late Rai Bahadur V. Venkayya, as the result of his examination of the larger and smaller Sinnamanur plates, recorded his opinion that the last Madura College or Academy *(Kaḍaichchangam)* must have come into existence *prior to the middle of the 8th century* A.D. If we are right in concluding that the date of composition of *Silappadhikāram* was somewhere about A.D. 756, then it follows that Rai Bahadur V. Venkayya made a very shrewd guess, for the middle of the 8th century A.D. which witnessed the composition of *Silappadhikāram* became by that very fact the highwater mark of Sangam literature.

34. Notwithstanding the hint thrown out by Dr. Hultzsch in 1895, no one seems to have thought it worth while to probe the alleged identity of Gajabāhu of *Silappadhikāram* with Gajabāhu I of *Mahavamso*: but Dr. Kumāraswāmi's suggestion referred to by Dr. Hultzsch was accepted and most rigidly carried to its logical conclusions by that great Tamil scholar the late Mr. V. Kanagasabhai Pillai in his "*Tamils 1,800 years ago*," a work which enjoys a deservedly high reputation.

but which, if reprinted, as it ought to be, would have to be re-named "*Tamils 1200 years ago*," for the whole work is concerned with events, persons and poems centred in the last Sangam which, we have seen flourished not more than 1200 years ago. Mr. Kanagasabhai Pillai's views, accompanied and enforced by copious illustrations from Sangam literature, have been adopted by almost every subsequent writer on the subject, e.g., Mr. M. S. Purnalingam Pillai, B.A., in his "Primer of Tamil Literature" (1904), Mr. S. Anavaradavinayakam Pillai, M.A., in the Introduction to his Edition of *Nāladi*, Mr. T. A. Ramalinga Chettiyar, B.A., B.L., in his *Age of Pattupāttu*, contributed to the *Tamil Antiquary*, and by most magazine writers in *Sen Tamil* and other periodicals devoted to Tamil literature. All the same, these somewhat overdrawn pictures of the state of civilization in Southern India 1800 years ago will have to be revised in the light of our present day knowledge of epigraphy and chronology, and the scenes of the Madura Sangam will have to be transferred from the first century A.D. to the late 7th and early part of the 8th century A.D., *the period which witnessed, along with the decay of Buddhism, the rise of the Śaivite and Vaishnavite teachers, Tirugnānasambandar, Śankarāchārya, Nammālvār, etc.*

35. Incidentally, this readjustment of dates will enable us to understand why Tiruttakkadevar's *Jīvaka Chintāmani* has always been classed in Tamil literary tradition with the other great works of the Sangam period. Those who have adopted the "Gajabāhu" or "2nd century" theory have been obliged to place in their imagination a gulf of some 600 years between the date of composition of *Silappadhikāram* and that of *Jīvaka Chintāmani*, because it is well known that the latter poem was founded on *Mahāpurānam*, the first part of which, *Pūrvapurānam*, was written by Jina Senachārya, the preceptor of the Rāshtrakūta king Amōghavarsha I, who ascended the throne in A.D. 813, while the second part or *Uttarapurānam* was the work of Jina Senāchārya's disciple Gunabhadrāchārya.

36. Now it is a fact that the text and commentary of *Jīvaka Chintāmani* contain a date which can be stated with certainty as A.D. 813, the very year of accession of Amoghavarsha I. From the canto of the poem called *Gandaruva Tattayār Ilambakam* and the commentary thereon we extract as many as five identities:—

(*Commentary on stanza No.* 493).

(1) Māśi 1 = Māgha *bahula* 10;
(2) Māśi 6 = Māgha amāvāsyā.
(3) Panguni 4 = Phālguna *bahula* 14.
(*Stanza* 590) (4) Simha lagna on Friday, Phālguna *sukla* 3 = nakshatra "Uttra Bhādrapada."
(*Stanza* 621) (5) Thursday in the week following = "Rohinī."

We have to find a single solution to these five equations. We may try the years A.D. 813, A.D. 840, A.D. 935, A.D. 992, A.D. 1114, A.D. 1019, A.D. 1236, which are all years that contain likely elements; viz., in these years the first new moon in the solar year was more or less 14·35 days removed from Mesha sankranti, and Māgha Amāvāsyā fell at a late hour on Tuesday or an early hour on Wednesday; but only A.D. 813 satisfies all the conditions. In that year as we may see from the Ephemeris, Vol. II, Māśi 1 = Māgha, bahula 10 = 20 January A.D. 814 (Friday). Māgha Amāvāsyā fell on 25th January A.D. 814 (Wednesday), which was 6 Māśi. Phalguna *sukla* 3 and nakshatra "Uttara Bhadrapada" ended on Saturday 28th January 814 at 23 and 33 ghatikās, respectively, after sunrise; so that on Friday about sunset, when the *lagna* was *Simha*, the nakshatra current was "Uttara Bhādrapada" and the tithi current was *sukla* 3. In the following week, nakshatra "Rohini" ended at 18¼ ghatikās after sunrise on Thursday, 2 February A.D. 814. Lastly Panguni 4 in the same year was 22 February A.D. 814 (Wednesday), on which day Phālguna *bahula* 14 was current throughout the day, ending very shortly after sunrise next day. All this may be verified from Ephemeris, Vol. II.

37. We need not enter upon detailed calculations of other competing years; but any one curious to investigate the subject may satisfy himself that none of

the other years will suit our requirements in all respects, including "Simha" *lagna* which occurred about sunset.

38. It must not be supposed that the author of *Jivaka Chintāmani* wished it to be understood that that romance happened in the year A.D. 813-14. Had such been his sole intent and purpose in the passages cited above, nothing would have been easier for him than to have given us the Kaliyuga or Śaka year, or at least the Cyclic year (Prabhava, Vibhava, etc.) But in the astrological craze which overtook the country at a very early period, it became the fashion to attach an astrological causation to the principal events in the life of every hero or heroine: and of course the full astrological influence exerted by the planets at any time could not be brought out without mentioning the *lagna*, *vara*, *tithi* and *nakshatra*, or at least the *tithi* and *nakshatra*, or *vara* and *nakshatra*. Had some work been in existence during the Sangam period that gave *varas*, *tithis* and *nakshatras* in a sort of ephemeris for several hundreds or thousands of years, nothing would have suited better a Sangam poet who wished to compose or improve a romance and locate it, say, in 3000 B.C.; but in the absence of such a work of reference, the poet was driven to resort to *contemporary panchangas* and we are thus entitled to infer that any particular astrological combination mentioned by a poet and referrible to only one date, must have been obtained by him from a contemporaneous panchanga of that date. The reader may be disposed to doubt whether this explanation can be held to account for the way in which commentators like Adiyarkunallar and Nachinarkiniyar, who composed their commentaries some centuries after the date of composition of the poems commented on fill up, as they do, *lacunæ* in their authors' astrological references. The answer is that commentaries in Southern India generally spring up almost simultaneously with the publication of a poem of any importance; because, although the language of *Silappadhikāram* was far more intelligible to contemporaries than it is to us, yet it was the language of poetry and, in accordance with a practice as old as the *Tolkappium*, it had to be introduced to the world *obstetricante manu*, that is, through the mediation of a commentator. We know that Silappadhikāram had a commentary from the very beginning. The best commentaries no doubt survived in course of time, but in the great commentaries on the great Tamil poems, there seems to have been maintained a continuous unbroken tradition of annotation, dating from the date of each poem, and astrological peculiarities, whether alluded to in the text of a poem or supplied by the ingenuity of an early scholiast, would be just the sort of curious learning that would be handed down scrupulously from commentator to commentator.

39. In line 85 of the 26th Canto of Silappadhikāram it is stated that the Chera King Chenguṭṭuvan, after hearing the story of Kaṇṇaki from the shepherds or Kuravas, visited the "Nīlagiri" mountain for a day with his forces, and then proceeded to the North of India whence he procured stone for the image of Kaṇṇaki, which he solemnly installed in his capital Vanchi. What became of Kaṇṇaki-worship, thus instituted, is only partially known: for students of Tamil literature have searched in vain for any trace on the *continent* of Southern India, of this worship which became popular, and has remained so to this day, in *Ceylon*. The Nilgiri District, therefore, may be said to possess an additional interest for students of *Silappadhikāram*, in that not only is it alluded to by name in the text of the poem, but there still exists in that district a place called *Kannagimand*, (RIVERS' *Todas*, page 734), which is a *mand* or village belonging to the Toda clan of *Kerādr* (itself an echo of *Kerala*), and situated in Meknad, very near the Sisipara route, leading from Malabar into the Nilgiris, one of the probable routes by which, according to Mr. Rivers (page 704), the Todas themselves entered the Nilgiris. At Fair Lawn, which is at no great distance from Kaṇṇagimand, are the ruins of an extensive fort, erected possibly either by Chera Kings or by those who subsequently wrested from them the Nilgiris. For, three centuries later then the time we have been dealing with, we find copious epigraphic evidence of the conquest of the Nilgiris by the Hoysala King Vishnuvardhana (A.D. 1117), whose general "frightened the Todas, offered up the Nilgiri peak to the goddess of victory, and pursuing the Malayalis, made himself master of Kerala"—*Annual Report* of Madras Epigraphist for 1906–07, page 81.

APPENDIX (iv).

THE TRUE AND EXACT DAY OF BUDDHA'S DEATH.

(Reprinted from Indian Antiquary, 1914.)

The object of the subjoined chart is to show that the true date of Buddha's death (Tuesday, 1 April, 478 B.C.), is deducible from the eight week-day dates cited in Bishop Bigandet's *Life of Gaudama* (*Trübner's Oriental Series*). The demonstration is accomplished by selecting 5 out of the many dates which have from time to time been associated with Buddha (see a long list of such dates at p. 165 of Vol. II of Prinsep's *Tables*) and testing the week-days of the several occurrences with reference to each of these dates. The dates selected were :—

(1) 1027 B.C., which is the most frequently occurring among the dates collected by Prinsep ;

(2) 901 B.C., corresponding to 980 B.C. for the birth, and to 901 B.C., for the death ; which is said to be quoted by Jachrig from Pallas' Mongol Chronology (Prinsep, *loc. cit.*) ;

(3) 846 B.C., corresponding to 835 B.C., which is said by Prinsep to be the era adopted at Lhassa and founded on an average of 9 dates : 846 B.C. appears to be the date of "Buddha's appearance" alluded to in a well-known Tamil Buddhistic poem of 8th cent. A.D. called "Manimēkhalai ;"

(4) 638 B.C., known as the Peguan date ; and lastly,

(5) 478 B C., Cunningham's second date, which, at page 22 of *J. R. A. S.*, 1909, Dr. Fleet admits to be an alternative to his own date, 483 B.C., Kârttika śukla 8.

In selecting supposed dates for trial, I have endeavoured to limit myself to typical ones, i.e., to those which have at least *some* points in their favour. I made an exception in favour of 846 B.C., because, though wide of the mark, it is a curious date and seems to have been adopted by Tamil Buddhists of the 8th century A.D., who appear, according to indications in the Tamil poem Manimēkhalai to have believed that Buddha was born on the 14th day of Rishabha month and on a day of nakshatra Viśâkha. The same poem refers to the year 1116 of an era, apparently a Buddha era, having been reached circa A.D. 770. Other dates, which might have been selected, had to be rejected *in limine*, because the week-days were obviously unsuitable. This remark applies to 544 B.C., which would give a *Sunday* (instead of Tuesday) as the day of Buddha's death, as well as to 543 B.C., in which the tithi and nakshatra of Buddha's death concurred on a *Friday*. As

[*Continued on page* 474 *infra*]

N.B.—The following abbreviations are used in the chart below.

1. *su.* for *śukla*, the bright fortnight of a lunar month. *Bahula paksha* is not referred to even once in the chart.

2. *f. d. t.* and *f d. n.* These symbols indicate respectively that a *tithi* or a *nakshatra* ended on the *following day* after that cited as the day of the *tithi* or the day of the *nakshatra*. Ordinarily a *tithi* or a *nakshatra* is cited as belonging to the day on which it comes to end but occasionally, it is cited as belonging to the day when it only commences. "*F. d. t.*" and "*f. d. n.*" mean accordingly "*following day's tithi*" and "*following day's nakshatra.*"

3. The ending moments of *tithis* and *nakshatras* are generally given correct to two decimal places of a day. The key to this system will be found in the author's Eye-table. Thus ·20 means 12 *ghatikâs* after sunrise.

4. When both *tithi* and *nakshatra* are cited, the ending moment of the *tithi* is given first, and then the ending moment of the *nakshatra*.

5. The English calendar years cited in pairs run from 1 March to 0 March, (*i.e.* the last day of February). Thus 1096-95 B. C. is the period from 1 March 1096 to 28 February 1095. At the epoch we are considering, this period coincided very nearly with an Indian solar sidereal year.

6. The expression "preceded by an adhika month" draws attention to the circumstance that the lunar year under consideration was one of 13, not of 12, months.

Chart to show that the true and exact day of Buddha's death (1 *April* 478 *B C.*; *Tuesday*)

8. Week-Day dates in Bigandet's Life of Gaudama.	Supposed central date 1027 B.C.	Supposed central date 901 B.C.
1. Kauzda Era given up on Saturday 1st of the moon of Tabaong (= Phālg.). Reference: Vol I, p. 13.	1096-95 B.C. Phālguna (preceded by adhika month) śukla 1 was Wed. Jany. 30, 1095 B.C.; ·39. N.B.—Abolition of last year of old Kauzda Era.	1050-49 B.C.; Phālguna (preceded by *adhika* month). śu. 1 was Sat. Feb. 1. 1049. B.C. Tithi ended at ·21. N.B.—Abolition of last year of Kauzda Era. Sat. was prob. Ādi Chandrodaya.
2. Commencement of Eetzana Era-Sunday, 1st of the waxing moon of Tagu (=Chaitra). Vol. I, p. 13. In Vol. II, p. 133, footnote, Bigandet is in obvious error as to this date: see para. (6) of explanatory note.	1095-94 B.C. Chaitra Śukla 1= Friday, Mar. 1. 12, 1095 B.C. N.B.—Eetzana Era, year 0, marked by Phālguna śukla 1 in 1096-95 B.C.	1049-48 B.C.; Chaitra śukla 1= Sunday, 1 Mar. 1049 B.C.; ·71. N.B.—Monday was prob. Ādi Chandrodaya. 2. Eetzana Era, year 0 marked by Phālguna śukla 1 in 1049-48 B.C.
3. Birth of Buddha, year 68; Vaiśākha Pūrṇimā; Nakshatra "Viśākha," Friday. Vol I, p. 28; Vol. II, p. 71. Conception having taken place under Nak. "Utt. Ashāḍha" in Śrāvana month and birth under "Viśākha," Vaiśākha su. 15 is the implied date of birth	1027-26 B.C. Friday, April 11; 1027 B. C.; ·34; ·16. N.B.—Phālguna śukla 1 in 1028-27 B.C. marked year 68, expired, of Eetzana Era, (1096 less 1028).	980-79 B.C.; Friday, April 1, 980 B.C.; ·96; f. d. n. ·45. N.B.—1. Nak. "Viśākha" was current on Friday and ended on Sat. at ·45. 2. Phālg. śukla 1 in 981-80 B.C. marked Eetzana 68 expired (1049 less 981).
4. Buddha leaves Kapilavastu—year 96, Sunday, Ashāḍha Full Moon-Nakshatra "Uttara Ashāḍha"; and enters into solitude next day, Monday. Vol. I, pp. 62-64 (year 97.) Vol. II, p. 72 (year 96.)	999-98 B.C. Tithi ended on Sunday June 29, 999 B.C. at ·31 and Nakshatra had ended on *Sat.* at ·49. This was Śrāvaṇa full-moon. N.B.—1. Nak on Sund. was not Uttara Ashāḍha. 2. Phālguna śukla 1 in 1000-999 B.C. marked year 96, expired, of Eetzana Era (1096 less 1000) and 97 current.	952-51 B.C., Sunday, 19 June, 952 B.C., ·88; ·80. N.B.—1. This was Ashādha full-moon (preceded by adhika month). 2. Phālg. śukla 1 in 953-52 B.C. marked Eetzana 96 expired (1049 less 953) and 97 current.
5. Attainment of perfect wisdom-year—103, Vaiśākha full moon; Viśākha Nakshatra; Wednesday. Vol. I, p. 97 "a little before the break of day." Vol. II, p. 78.	992-91 B.C.; Wednesday, April 14-17, 992 B. C.—pūrnimā; but nakshatra Viśākha had ended on *Tuesday* at ·77 of day. N.B.—1. Nak. on Wed. was not Viśākha. 2. Phālguna śukla 1 in 993-92 B.C. marked year 103 expired of Eetsana Era (1096 less 993).	945-44 B.C.; Wed. 4 April 945 B.C.; ·61; ·91. N.B.—Phālguna śukla 1 in 946-45 B.C. marked Eetzana year 103 expired (1049 less 946).
6. Death of Buddha's father Suddhodana, —year 107, full moon of Wakaong (=Śrāvaṇa); at sunrise on Saturday. Vol. I, p. 208.	988-87 B.C. Friday, June 27·55, 988 B.C.; Śrāvaṇa full-moon. N.B.—Phālguna śukla 1 in 989-88 B.C. marked Eetzana year 107 expired (1096 less 989).	941-40 B.C.; Sunday, July 17·90, 941 B.C.; full-moon of Śrāvaṇa (preceded by adhika month.) N.B.—Phālguna śukla 1 in 942-41 B.C. marked Eetzana, 107 expired (1049 less 942).
7. Death of Buddha.—year 148; Vaiśākha full-moon. Nak. "Viśākha" Tuesday: a little before day break. Vol. II, pp 69, 73.	948-47 B.C; Tuesday, 7 April, 948 B.C.; ·84; ·97. N.B.—Phālguna śukla 1 in 949-48 B.C. marked Eetsana 148 current or Eetzana 147 expired.	901-00 B.C.; Wed. Mar. 29; 901 B.C.; ·21; ·99. N.B.—1. Nak. "Visakha" commenced at ·04 on Wed and was not current on Tuesday. 2 Phālg. śu. 1 in 902-01 B.C. marked Eets. 148 current and 147 expired.
8. The new religious era commences in the year of Buddha's death 148 on Monday, first of the moon of Tabaong (=Phālguna). Vol. II, p. 113. The week-day was possibly Sunday which appears in another version recorded by Bigandet; vide footnote to p. 133, Vol. II, and para (6) of explanatory note.	949-48 B.C.; Phālg. su. 2=Monday, Jan. 26 ·64, 948 B.C. N.B.—This was the Phālguna before Buddha's death and marked new era, year 0 Phālguna śukla 1 in 948-47 B.C. marked year 1 expired of new religious era.	902-01 B.C. Phālg śu. 1 was Sunday, Jany. 16, 901 B C.; ·34; the same day was Ādi Chandrōdaya. N.B.—This was the Phālguna before Buddha's death and marked year 0 of the new religious Era. Phālg. śukla 1 in 901-00 B.C. marked year 1 expired of new religious era.

as deducible from the week-day dates cited in Bishop Bigandet's Life of Gaudama.

Supposed central date 846 B.C.	Supposed central date 638 B.C.	Correct central date 478 B.C.
916–15 B.C.; Phâlguṇa Śukla 1 was Monday, 20 Jany. 915 B C.; 71. N.B.—1. Sat. was not Phâlguṇa śukla 1 or 2. 2. Abolition of old Kauzda Era.	637–36 B.C.; Phâlguṇa śukla 2 ended on Sat. Jan 26 ·90 636 B.C. N B.—Abolition of old Kauzda Era	627–26 B.C.; Phâlguṇa śu. 1, (preceded by *adhika* month) ended on Sat. Feb. 4. 626 B.C. at ·39. N.B.—Abolition of Kauzda Era.
916–15 B.C.; Chaitra śu. 1=Wed. Feb. 19· 10, 915 B.C. N B.—Sunday was not Âdi Chandrodaya, 2. Eetzana year 0 marked by Phâlguṇa śukla 1 in B.C. 915–14.	637–36 B.C.; Chaitra śukla 1 ended on Sunday Feb. 24 ·57, 636 B.C. N.B.—Eetzana Era, year 0 began B.C. on Phâlguṇa śu 1 in 636–35.	626–25 B.C. New moon at the beginning of Chaitra month was Sat. March 4 ·99 626 B.C śukla 1 ended on Monday, March 6 at ·05 and this was first Chandrôdaya. śukla 1 was current throughout Sunday. N.B.—Phâlguṇa śu. 1 in 626–25 B.C. marks Eetzana year 0 (abt. 25 Jany. 625 B.C.).
846–45 B.C.; Tuesday, April 20; ·846 B.C.; 89, ·21. N B.—1 Solar and lunar year began at practically the same moment. The Tuesday was 14 Rishabha; u 14 ended on Tuesday at 08 (2) Phâlguṇa śu 1 in 847–46 B.C marked Eetzana 68 (915 less 847).	567–66 B.C.; *Thursday*, March 26, 567 B.C.; ·38; Nak. ended on Sat. at ·17 N.B.—1 Friday was not Vaiśâkha śu 15. 2 Phâlguṇa śu 1 in 568–67 B C marked Eetzana year 68 expired (636 less 568).	557–56 B.C.; Friday, 4 Ap. 557 B.C.; 69; f. d. n ·31. N.B—Phâlguṇa śu. 1 in 558 57 B.C. marks Eetzana year 68 expired (626 less 558).
818–17 B C; Wed. 9 June, 818 B.C.; ·48; f. d n. ·23. N.B.—This was Âshâḍha full moon but neither tithi nor nak. fell on Sunday. 2. Phâlg. śu. 1 in 819–18 B.C. marked Eetzana 96 expired (915 less 819) and 97 current.	539–38. B C. Śrâvaṇa full moon ended on Monday, 13th July 539 B.C at ·44 and Nak. "Uttara Âshâḍha" had ended at ·58 on Sunday. Âshâḍha full moon was Sat. Jun 13 ·97 Nak. "Uttara Âshâḍha" in that month was Monday, June 15 ·28. N B—Phâlguṇa śu. 1 in 540–39 B.C marked Eetzana year 96 expired (636 less 540).	529–28 B C.; Nija Âshâḍha full Moon and Nakshatra "Uttara Âshâḍha" ended at ·59 and 62 respectively of Sunday 22 June, 529 B.C. N.B.—Phâlguṇa śu. 1 in 530–29 B.C. marks Eetzana 96 expired (626 less 530) and 97 current.
811–10 B C.; Sat. 25 Mar.; 811 B.C.; ·19; f. d. n. ·32. N.B.—Week day was not, Wednesday. 2. Phâlg. śu. 1 in 812–11 B C marked Eetzana 103 expired (915 less 812)	532–31 B.C.; *Tuesday*, 29 March 532 B.C.; ·6; f. d. n. 77. N.B.—Phâlguna śu. 1 in 533–32 B.C marked Eetzana 103 expired, (636 less 533).	522–521 B.C.; Wednesday, 8 April 522 B.C.; ·36; ·74. N.B—Phâlguna śu. 1 in 523–22 B.C. marks Eetzana 103 expired. (626 less 523).
807–06 B.C., Wed 7 July 807 B C. ·17 N.B.—Śrâvana full moon, but week-day was not Sat. 2. Phâlg. śu 1 in 808–07 B C. Eetzana marked 107 expired (915 less 808).	528–27 B.C.; Saturday 11 July, 528 B.C. . 53. N.B.—Phâlguna śu. 1 in 529–28 B.C marked Eetzana 107 expired (636 less 529).	518–17 B.C.; full moon tithi of Śrâvaṇa commenced on Sat. 20 July, 518 B.C. at ·61 and ended on Sund. 21 July at ·51 of day. Saturday, at sunrise of which Suddhodana died, was loosely called full Moon, although this description was properly applicable to night between Sunday and Monday. N.B.- Phâlg śu 1 in 519–18 B.C. marks Eetzana 107 expired (626 less 519).
767–66 B.C.; Sund. 17 Ap. 767 B.C.; 14-Nak. "Visakha" ended on Sat at ·74. N.B.—Phâlg. śu. 1 in 768–67 B C marked Eetzana 148 current and 147 expired (915 less 768).	488–87 B.C; *Wednesday*. April 21. ·97; 29. 12th day of Rishabha (Solar month). NOTE 1. Tuesday was not Vais. śu. 15. 2. Phâlg. śu. 1 in 489–88 B.C. marked Eetzana 147 expired, 148 current (636 less 489).	478–77 B.C.; "Viśâkha" nakshatra commenced at ·87 on Tuesday, 1 Ap. 478 B.C. and ended at ·89 on Wed.; śukla 15 was current all Tuesday and ended on Wednesday about sunrise. N.B.—Phâlguṇa śu. 1 in 479–78 B.C. marks Eetzana 147 expired, 148 current.
768–67 B.C.; Phâlg. (preceded by *adhika* month), sukla 1 was Wed 2 Feb; ·90. N.B.—Phâlg. śu. 1 in 768–67 B.C. marked year 0 of new religious era and Phâlg. śu. 1 in 767–66 B.C. marked year 1 expired of new era.	489–88 B.C Phâlguṇa śukla 1 (preceded by *adhika* month) ended on Monday Feb. 8, 488 B.C. at ·72. NOTE.—Phâlguṇa śu 1 in 489 B C. marked year 0 of new religious era. Year 1 expired was marked by Phâlg. śu. 1 in 488–87 B.C	479–78 B.C. Phâlguna śukla 2=Monday Jany. 20 ·98, 478 B.C. Phâlguṇa śukla 1 ended on Sunday 19 Jany. 478 B.C. at ·89 of the day. N.B.—Phâlguṇa śu. 1 in 479–78 B.C. marks year 0 of new religious era. Year 1 expired is therefore marked by Phâlguṇa śu. 1 in 478–77 B.C.=Eetzana 148 expired (626 less 478).

regards 483 B.C., I must say, with reference to Bigandet's week-days, that a more improbable year would be difficult to find, since in that year Vaiśākha pūrnimā ended on Saturday March 28·90, while Nak. "Viśākha" commenced on Sunday, March 29·02 and came to end on Sunday, March 29·98: in other words, pūrnimā and "Vaiśākha" Nak., did not concur in Vaiśākha month of that year for even one second of time. The year, 484 B.C. is a more probable year, because both Vaiśākha Śu. 15 and "Vaiśākha" Nak. ended in that year on a Tuesday.

An additional reason for selecting (2) 901 B.C., was that if any year was likely to yield week-days identical with those yielded by 478 B.C., it was 901 B.C., on account of a well-known cycle in Indian Chronology by which week-days, tithis and nakshatras generally repeat themselves on the same days of the Indian sidereal year once in 423 years. The year 901 B.C. does yield week-days closely similar to those yielded by 478 B.C., except that it fails at the most important point and brings out the week-day of Buddha's death as Wednesday instead of Tuesday.

It will be seen that the only year for Buddha's death which brings out all the week-days correctly is 478 B.C. The number of tests could be multiplied, but we may be fairly certain that the result would always go to confirm 478 B C.

This being so, it becomes an important question when these week-days were first recorded. Evidently, not during Buddha's life time or shortly after his death, because the week-day, as a detail used for ordinary citation was not known in Europe till the 3rd century A.D. and probably was not known in India till least the 5th century A.D.: indeed, week-day citations are not *commonly* met with in India till the 8th century A.D.—[See on the whole subject of the Indian week-day, Dr. Fleet's valuable article in Oct. issue of *J.R.A.S.* for 1912 pp. 1039–1052].

The Burmese chronicle, translated by Bishop Bigandet, is called *Malla-linkara wouttoo* and was composed about A.D. 1773, but Prof. Rhys Davids testifies to the substantial, even verbal, identity of that chronicle with the Jataka commentary current in Ceylon in 5th century A.D (Prof. Rhys Davids, cited by Mr. Harry C. Norman in *J. R. A. S.* 1908 p. 15). We may, therefore, assume that the week-days in Bigandet's *Life of Gaudama* were calculated [1] retrospectively by some one between the 5th and the 8th century A.D.: but even so, we are led to infer that the true date of Buddha's death, though forgotten, as Dr. Fleet has shown, by 1200 A.D. in Ceylon, had been preserved in the traditions of Buddhists for at least a thousand years after the death of Buddha.

There are certain points worthy of note in the calendar system disclosed by an investigation of these week-days :—

(1) In this calendar there runs throughout an implied distinction between the commencement of an *era*, and the commencement of a *year*. The commencement of eras was shifted from time to time, it was śukla 1 of Chaitra of a particular year under the Eetzana Era, and under the New Religious Era, it was associated with the date of Buddha's death; but what is clear is, that the commencement of the *year* was always the same, i.e., śukla 1 of Tabaong or Phālguna. As an analogous case, we may cite the era of the reformed English calendar which began on 14 Sep. A. D. 1752, though the commencement of the year was always the same as before, the 1st of January.

(2) Secondly, it is apparent, except in the case of the last date on the chart, that the commencement of the lunar month under this ancient calendar, was śukla 1 or pratīpada, as in the present day Indian calendar, and not the first heliacal rising of the moon, as in the Jewish and the Muhammadan calendar.

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[1] At the time when this article was first contributed to the *Indian Antiquary* (1914), there was just a possibility (though it seemed highly improbable), that the author of *Malla-linkarawouttoo* might have himself calculated the weekdays in accordance with the modern Burmese Calendar, which has been in use in Burma since 1738 A.D. In *Ind. Ant.*, Vol xxxix (1910), Sir Alfred Irwin has given the elements of the Burmese calendar from A.D. 638 to A.D. 1752, but adds: "it is not certain what calendars were actually observed in Burma before the *year* 1100 Burmese Era. = A.D. 1738." After a good deal of study of the relevant documents it has been found impossible to verify whether, according to the modern Burmese calendar, the week-days in Bigandet could be located anywhere else than in the years shown in the last column of my chart. Bigandet is certainly in error in supposing, in footnote to p. 188, Vol. II, and elsewhere, that they can be located with reference to 543 B.C. as the central date.

From the Introduction to Part II of Vol. I of the Ephemeris, it will be seen that Burmese dates before 1738 A.D. were in all probability calculated according to the Sūrya Siddhānta. Examples are given at the end of Section ii of Part II of Vol. I.

In the excepted case I suspect, as observed in paragraph (6) of this note, a wrong reading in Bigandet's English Translation (Vol. II, p. 113) of *Monday* for *Sunday*. On the other hand, the phrase *ādi chandrōdaya dinē* quoted by Dr. Fleet from *Dīpavaṁsa* (*J. R. A. S.* 1909), seems to refer, not necessarily to śukḷa 1, as assumed by him, but to the first day when the crescent was actually visible, and in 242 B.C., as shown below, this was actually śukḷa 2. The ordinary rule (p. 70 of the Text) is, that if śukḷa 1, ends before 42 of a day, (25 ghaṭikās after sunrise) the crescent will rise the same evening and that if śukḷa 1 ends later than ·58 of a day, (35 ghaṭikās after sunrise), the crescent will only appear next day. Between these limits, the day of the first appearance of the crescent is a matter of calculation.

Among other indications going to show that the "first of the moon" or "the first of the waxing moon" in Bishop Bigandet's translation is meant for śukḷa 1 is the following, which is also otherwise interesting. We are told at p. 107 of Vol. I that for 49 days from the attainment of perfect Buddhaship, i.e., from Vaiśākha pūrṇimā, Buddha did not taste food, and that on the 50th day which was the 5th of the moon of Watso he was hungry. [Bigandet's translation in this place "5th *after the full moon of Watso*" is an obvious mistake, since (1) 49 days from Vaiśākha pūrnimā can only take us to śukḷa 5 ($29\frac{1}{2} + 14\frac{1}{2} + 5 = 49$) in Watso or Āshāḍha, and (2) we know from p. 118 of Vol. I that some days after the conclusion of the 49 days fast, Buddha preached a sermon at *exact* full moon and *exact* sunset; this we may identify as Āshāḍha pūrṇimā or Watso full moon—which tithi, in 522 B.C., ended on 6 June at ·40 of the day or a little while before sunset.] The 50th day from Vaiśākha pūrnimā in 522 B.C. was Wednesday, 27 May = Āshāḍha (or Watso) śukḷa 5, which tithi ended at ·78 of the day. In this case, śukla 1 was first moon rise, but as śukḷa 1 ended on May 24·18, the 5th tithi, if it had been counted from first moon rise, would have been Thursday, May 28, the 51st day, not Wednesday the 50th day counted from Vaiśākha pūrnimā. It is clear, therefore, that tithis in the text translated by Bigandet were calculated, as now, from new moon and not from the first moon-rise.

(3) On the relative merits of 483 B.C. and 478 B.C. as years of Buddha's death, Dr. Fleet remarked, at p. 22 of *J. R. A. S.* 1909: "For the latter occurrence" (the anointment of Devānaṁpiya Tissa), "the mention of the Āshāḍha nakshatra indicates 247 B.C. or 242 B.C. The choice thus lies between 247+236 B.C. = 483 and 242+236 B.C. = 478 B.C. The earlier year is preferentially supported by a consideration of the circumstances which paved the way to the acquisition of sovereignty by Chandragupta."

It will be seen from the author's "Eye-table" that Nakshatra Pūrva Āshāḍha can coincide with Mārgaśīra śukḷa 1 or śukḷa 2 (on either of which days Devānampiya Tissa was anointed) only in a year in which some month previous to Mārgaśīra was *adhika*. This was the case with the years 247 B.C. and 242 B.C., and Dr. Fleet is, therefore, perfectly right in observing that the choice lies between these years. There is, however, this noteworthy difference between these two years. In 242 B.C., the year of anointment of Devānaṁpiya Tissa, corresponding to 478 B.C. for Buddha's death, Mārgaśīra śukḷa 2 ended on November 14, at $51\frac{1}{2}$ ghaṭikas (in Lanka time), after mean sunrise, and as śukḷa 1 had ended at the corresponding part of the previous day, it is clear, from the rule cited above, that śukḷa 2, Nov. 14, was *ādi chandrōdaya dina* or first moon-rise in the month. Nakshatra Pūrva Āshāḍha was current all through Nov. 14 and came to end at $2\frac{1}{2}$ ghaṭikas after mean sunrise next day. The case was very different in 247 B.C. Since, in that year, Mārgaśīra śukḷa 1 ended at 9 ghaṭikās after mean sunrise on 6 November, it is evident that, that was *ādi chandrōdaya dina* or the day when the crescent first appeared. Nakshatra Pūrva Āshāḍha, however, commenced only at $50\frac{1}{2}$ *ghaṭikās* after sunrise on the same day, i.e., 2 hours after midnight and was current for only about $9\frac{1}{2}$ *ghaṭikās* at the very end of the day. The anointment could, of course, have been performed in what we should call the small hours of the morning of 7 November, 247 B.C. so as to bring the ceremony within the influence of Pūrva Āshāḍha, but generally speaking, such a day would not be called a day of Pūrva Āshāḍha, whereas 14 Nov. 242 B.C. was strictly a

day when Pūrva Āshāḍha joined with the *ādi chandrōdaya dina* of Mārgaśīra. So far, the calculation of nakshatras appears to point to 242 B.C. rather than to 247 B. C. as the year of anointment of Devānaṁpiya Tissa; and consequentially, to 478 B.C rather than to 483 B C., as the year of Buddha's death. Dr. Fleet promised to exhibit in a separate article, the process of determining the nakshatras, but to the best of my belief he has not done so yet. The determination is very easy by the tables and method of my *Indian Chronology*.

(4) One of the reasons which led Dr. Fleet to adopt Kārttika śukḷa 8 rather than the traditional Vaiśākha śukḷa 15 as the day of Buddha's death, was that, on the latter assumption, it was not possible to place the two anointments of Devānaṁpiya Tissa 247 B. C. Mārgaśīra śukḷa. 1, and 246 B C., Vaiśākha śukḷa 15, as well as the arrival of Mahindo in Ceylon (B.C. 247 Jyaishṭha śukḷa 15) within the year designated by *Dīpavaṁsa* as "236 years after the death of Buddha," i.e., after 483 B.C., Vaiśākha śukḷa 15. He argued rightly that if each "Vaiśākha śukḷa 15" was the commencement of a new year, the arrival of Mahindo at any rate must belong to a year later than 236 expired of the Buddha era, which would be complete on Vaiśākha śukḷa 15, 247 B.C. Now, if as I have shown above, the ancient Buddhist year always took its departure from śukḷa 1 of Phālguna, then it follows (*a*) that year 236 expired of the religious era would be marked by Phālguna śukḷa 1 in (479 B.C. *less* 236=) 243 B C, and (*b*) that the second and third events, referred to above would both fall within the space designated by a single year, 236 expired, (running from 243 B.C. Phālguna Śukḷa 1 to 242 B.C. Māgha Amāvāsyā). Such being the case, the necessity for adopting Kārttika śukḷa 8 as the day of Buddha's death, in great measure, ceases. Dr. Fleet seems to think that both the anointments of Devānaṁpiya-Tissa should be placed within the 237th year current after the death of Buddha. I do not know if the text of *Dīpavamsa* requires this construction. The text, as quoted by him (*J.R.A.S.* 1909, p. 11) makes two statements, (1) that Devānaṁpiya-Tissa was anointed 236 years after the death of Buddha; (2) that he was twice anointed. It may be that the first anointment was in the 236th year current, towards its close, and the second in the 237th year current.

(5) It follows from an examination of these week-day dates that Buddha's age at the time of his death was 79 complete years, not 80 years, and that supposing he was born in the year 68 of the Eetzana Era, he could be said to have died in the year 148 of that era only in the sense that the year 148 was *varttamāna* or current. See, however, division (8) below of this note.

(6) Bishop Bigandet remarks in a footnote on p. 133 of Vol. II that the Kauzda Era was abolished on a certain Saturday which was the new moon of Tabaong (March) and that the Eetzana Era commenced next day Sunday the first after the same new moon. This of course is not correct, since the old era was abolished with effect from Phālguna (Tabaong) śukḷa 1 (See Vol. I, page 13), while the new era was brought into force with effect from śukḷa 1 of the next month Chaitra (=Tagu).

On the other hand, while referring to the commencement of the New Religious Era (the era of Nirvāṇa), Bigandet has made a mistake just the converse of the above. He says (footnote on the same page 133 of Vol. II): "In the year 148, the first day of the month of Tagoo (April), which fell on a Sunday, was fixed as the beginning of the new computation, emphatically called the era of religion, 543 B.C." We need not concern ourselves with 543 B.C. (As a matter of fact, the first of the new moon of Chaitra or Tagoo in 543 B.C. was Wednesday, not Sunday.) But it will be seen from a comparison of this passage with those at page 13 of Vol. I and page 113 of Vol. II, (1) that where Bigandet affirms Phālguṇa Su. 1 to have been the beginning of the Kauzda Era, he should have said this of Chaitra su. 1; and (2) that where he affirms Chaitra su. 1 to have been the beginning of the New Religious Era, he should have said this of Phālguna su. 1. So far, there may have been, on his part, a mere mistake of transposition of months, but in saying (in footnote to page 133, Vol. II,) that *Sunday* was the beginning of the new religious era (Era of Buddha's death), he is backed by the calculations exhibited in my chart against the 8th date; and contradicted by his

own statement in the text (page 113 of Vol. II), that the New Religious Era began on a *Monday*. Should my conjecture that *Sunday* was the proper week-day in this case prove justified by a reference to the Burmese manuscript used by Bigandet or to any other original text, then it will follow that "first of the waxing moon" throughout the chronicle translated by Bigandet means "*Śukla pratipada*," and not the first heliacal rising of the moon.

(7) In one or two instances, details of dates, not explicitly affirmed by Bigandet, have had to be supplied from other circumstances stated by him. Thus, as regards the birth of Buddha, we are told, in the first place (Vol. I, page 28), that he entered the womb of his mother Māyā at a full moon under the constellation "Oottarathan" (= "Uttara Āshādha"). Reference to the Eye-Table appended to my *Indian Chronology* will show that this must have been the Full Moon of Śrāvana. As Buddha was born 9 months later under the constellation "Withaka" ("Viśākha"), (Vol. II, page 71), the birth, as may be seen from the same table, must have taken place at the Vaiśākha full moon, not 6 days after the same full moon (as stated erroneously in the footnote to page 47, Vol. I), when Nakshatra "Vaiśākha" would be an impossibility.

Similarly, when we are told (Vol. I, pages 62—64) that Buddha, preparatory to embracing the life of an ascetic, left Kapilavastu at the full moon of "July" under the constellation "Oottarathan," we may infer that it was the full moon of Āshāḍha month, because elsewhere Bigandet has rendered the Burmese "Watso" (= Āshāḍha month) by "July" (see, for instance, Vol. I, page 200). July is no doubt the English equivalent of Āshāḍa *at the present time*; but it was not so in Buddha's time when the equivalent of Watso or Āshāḍa was May-June. The reader has to be reminded that English months, in 477 B.C meant, in comparison with Indian months, a time of the sidereal year more than one month in advance of what they now mean. This result is due (1) to the forward movement of the Indian sidereal, as compared with the European tropical, year, and (2) to the dropping of 10 days in the Gregorian Calendar. In support of my statement that the departure from Kapilavastu took place on a *Sunday*, I may refer to Vol. II, page 72, where the next day when he entered into solitude is given as *Monday*.

Lastly, the year when Buddha left his home to lead a hermit's life is given as "Eetzāna 97" in Vol. I, page 62, and as "Eetzāna 96" in Vol. II, page 72. This is not a discrepancy, because we may understand the former to be an *expired*, the latter a current, year Similarly, the Eetzāna year of Buddha's death, 148, has, I believe, to be understood only as a *current* year, equivalent of *expired* year 147.

(8) I have reserved for the last place the discussion of the important question, whether, admitting the correctness of the dates shown for Buddha's *life*, in the last column of the chart, the date of his *death* may not be 477 B.C., as conjectured, first by Cunningham, and more recently by Prof. Charpentier of Upsala in the July 1914 issue of *Indian Antiquary*. I am bound to say that two sets of considerations are in favour of 477 B.C : in the first place, this date would make him fully 80 years old when he died, which indeed is the commonly received age, attained by Buddha when he passed into *Nirvana*; and in the second place, although the week day of Vaiśākha śu. 15 and Nak. "Viśākha" in 477 B.C. was *Monday* (April 19; ·90; ·44), yet the next day was *Tuesday*, and as he is said to have died "*on* Tuesday, a little before day break", this may mean, though not strictly, "a little before the daybreak *of* Tuesday": that is, in the early morning hours of what we should call Tuesday (in the Indian Calendar, in the last hour or two of Monday).

The real difficulty, however, about 477 B.C. is in harmonizing with this date the statement that the new religious era began on the 1st of the waxing moon of Tabaong (Phālguna) "in the year of Buddha's death," the week-day being either Sunday, as stated in Bigandet's note on page 133 of Vol II, or Monday, as stated at page 113 of Vol. II of his text. The following are all the relevant Phālgunas:—

Phālguna śukla 1 of 479—78 B.C. fell on Sunday, 19 Jan. 478, B.C. ending at ·88 of day.

,,	,,	,,	478—77	,,	fell on a		Friday.
,,	,,	,,	477—76	,,	,,	,,	Wednesday.
,,	,,	,,	476—75	,,	,,	,,	Sunday (ending at ·78 of day).

We cannot possibly adopt the Phālguna śu. 1 of either 478-77 B.C. or 477-76 B.C. as the commencement of New Religious Era, because in neither case was the week-day Sunday or Monday. We are driven, therefore, to conclude that the 12 months beginning with Phālguna of 479-78 B.C. (19 January 478 B.C. were the 12 months constituting "the year on which Buddha died," i.e., that he died on Vaiśākha śu. 15 of 478 B.C., not on Vaiśākha śu. 15 of 477 B.C.

(9) The Eetzāna Era is no doubt, as observed by Dr. Fleet in *J. R. A. S.* 1912, page 239, "a late invention"; but it is, nevertheless, a true invention,

(*a*) because the dates expressed in that era are, *astronomically*, true dates; and

(*b*) because they include, by implication, one *historically* true date, the year, 478 B.C. of the death of Buddha.

The week-days, coupled with tithis and nakshatras, direct our attention, with almost absolute certainty, to one and *only one* series of years which, thanks to them, can be verified and identified with as much confidence as if they had been recorded in 478 B.C. Knowing, then, from other sources, the historical probability of the central year, 478 B.C. (that it is approximate, according to Dr. Fleet, within 5 years, does not detract much from its historical value), we need not be disturbed by the reflection that this and other surrounding dates must have been laboriously calculated, and for the first time fitted out with the full dress of *vāra*, *tithi* and *nakshatra*, by some astronomer in the 5th, 6th, 7th or a later century A.D. The later the century, the more genuinely do the historian, the chronologist and the critic become interested in the discovery that, for a thousand years, if not more, after Buddha's death, the true *year* of its occurrence was, notwithstanding many contradictory traditions, faithfully preserved somewhere in Buddhistic sacred lore.

APPENDIX (v).

ASTRONOMICAL REFERENCES IN THE MAHĀBHĀRATA.

(Originally delivered as a lecture under the auspices of the Madras Literary Society.)

(1) *Bhīshma Parva, Chapter 2, verse 23.*
ālakshé prabhayā hīnām paurnamāsīmcha kārtikīm
Chandro bhūdognivarnaścha padmavarṇe nabhastale.

Even in the night of the Kārtika full moon, the moon, having lost all its splendour, became invisible (or looked like fire), the sky looking like lotus.

(2) *Bhīshma Parva, Chapter 2, verse 32.*
rōhinīm pīdayannesha sthito rājan sanaiścharah
vyāvṛittam lakshma somasya bhavishyati mahadbhayam.

O! King, the planet *Śani* oppresses Rohini. The sign of the deer in the moon has shifted from its position. A great evil is foreboded by all this.

(3) *Bhīshma Parva, Chapter 3, verse 12*
śveto grahastathā chitrām samatikramya tishthati
abhavam hi viśesheṇa kurūnām tatra paśyati.

Ketu, the white planet, stops on passing beyond the constellation Chitrā. All this forebodes total destruction of the Kurus.

(4) *Bhīshma Parva, Chapter 3, verse 13.*
dhūmaketuh mahaghorah pushyam chākramya tishthati
senayoraśivam ghoram karishyati mahagrahah.

A fearful comet is rising and is distressing Pushya; this great planet will cause great havoc to both armies.

(5) *Bhīshma Parva, Chapter 3, verses 14 to 16.*
maghāsvangārako vakrah śravaṇecha brihaspatih
bhagam nakshatramākramya sūryaputreṇa pīdyate.
śukrah proshṭhapado pūrve samāruhya virochate
uttare tu parikramya sahitah samudīkshyate
śveto grahah prajvalitah sadhūma iva pāvakah
endram tejasvi nakshatram jyeshṭhām ākramya tishṭhati.

Mars is retrograde in Maghā and Brihaspati in Śravaṇa. The sun's offspring Śani advances towards Bhaga and afflicts it. The planet Śukra rises towards Pūrva Bhādra, shining brilliantly and looking towards Uttara Bhādra (Dutt's translation). Ketu, blazing like smoky fire, stops and afflicts the effulgent constellation of Indra.

(6) *Bhīshma Parva, Chapter 3, verse 17.*
dhruvah prajvalito ghoramapasavyam pravartate
rohinīm pīdayantau tavubhau cha śaśibhāskarau
chitrā svātyantare chaiva dhishthatah parushagrahah.

The constellation Dhruva, fearfully blazing, advances towards the right. Both the sun and the moon distress Rohini. A terrible planet (Rahu?) has taken up its position between Chitrā and Svāti.

(7) *Bhīshma Parva, Chapter 3, verse 18.*
vakrānuvakram kritvā cha śravaṇam pāvakaprabhah
brahmarāśim samāvṛitya lohitāngo vyavasthitah.

The red bodied planet, effulgent like fire, passing in a round and round way, stops encircling Śrāvaṇa overridden by Brihaspati.

(8) *Bhīshma Parva, Chapter 3, verse 27.*
saṃvatsarasthāyinau cha grahau prajvalitāvubhau
(viśākhāyāh samīpasthau) bṛihaspatiśanaischarau.

Those two burning planets, Bṛihaspati and Śani, have become fixed for a year.

(9) *Bhīshma Parva, Chapter 3, verse 29.*
krittikām pidayanstikshnaih nakshatram prithivīpate
abhikshnavātā vāyante dhūmaketumavasthitāh.

O King, Rahu of terrible deeds afflicts Krittikā. Rough winds, foreboding terrible danger, are continually blowing.

(10) *Bhīshma Parva, Chapter 3, verse 32.*
chaturdaśīm panchadaśim bhūtapūrvām cha shodaśīm
imāmtu nābhijānami amāvāsyām trayodaśīm.

A lunar fortnight has hitherto consisted of fourteen days or fifteen days or sixteen days. But on the 13th day and in the course of the same month two eclipses have taken place.

(11) *Bhīshma Parva, Chapter 3, verse 33.*
chandrasūryavubhau grastavekahne hi trayodaśīm
aparvani grahāvetau prajā samkshayayishyatah.

(12) *Udyoga Parva, Chapter 142, verse 18.*
saptamāccāpi divasāt amāvāsyā bhavishyati
sangrāmo yujyatām tasyam tāmāhuh sakradevatām.

In 7 days there will be full moon and on that day let us engage in fight, for this is the day favourite to Sakra.

(13) *Udyoga Parva, Chapter 143, verse 8.*
prājāpatyam hi nakshatram grahastīkshno mahādyutih
śanaiścharah pīdayati pīdayan prānino adhika.

That active planet of great effulgence, śani, troubles the star Prajāpatya, indicating greater trouble to living creatures.

(14) kritvāchāngārako vakram jyeshthāyam madhusūdana
anurādhām prārthayate maitram samgamayanniva.

The planet Angaraka travels retrograde to the constellation Jyeshtha, O! slayer of Madhu, and goes towards Anurādhā as if seeking its friendship.

(15) nūnam mahadbhayam krishna kurūnām samupasthitam
viseshena hi vārshnēya chitrām pīdayate grahah.

Surely, O! Krishna, a great calamity for the Kurus is at hand, especially as the planets go against Chitra.

(16) somasya lakshma vyāvrittam rāhurarkamupaiticha
divaścholkāh patantyetāh sanirghātah sakampanāh.

Rahu comes to the sun which has covered the path of the moon and from the heavens fall down meteors with loud noise and making the earth shake.

* * * * *

The foregoing passages of the Mahābhārata contain the principal astronomical references to be found in that epic, but for the reasons stated in paragraph 246, page 100 of the text, it was not possible to deal with them methodically along with Rāmā's horoscope. The popular impression concerning these references is that the observations in question were made at the time of occurrence of the events described in the Mahābhārata, while the pious hope of even the well-informed portion of readers and hearers of the Mahābhārata is that it may be possible, by means of these references, to determine the date of those events, or at least of the composition of the poem. The remarks made in paragraph 246, page 100 of the text, will have prepared the reader for the conclusion that there is absolutely no scientific or historic warrant for either the popular impression or the pious hope. The astronomical details given in the Mahābhārata differ in one important respect from those in the Rāmāyaṇa. Rāmā's horoscope, even though the framer thereof may not have had in view any particular year, month, or date, *can* be located in time, if we regard it, as we did in section iii of Chapter V of the text,—as the subject of a purely astronomical problem; whereas the Mahābhārata references cannot possibly yield a date, because (1) they are mutually repugnant, as has been stated already at page 100 of the text, (2) they are the evident result of interpolation by subsequent writers, and (3) they seem to have been interpolated at different times and in different centuries A.D.

2 The general opinion of modern critics regarding the date of composition of the Mahābhārata is that it must have taken four or five centuries for its composition, viz., from about 300 B.C. to about A.D. 200 and, that the main part of the work may be held to have been composed during this period. But the Mahābhārata, apart from its being a national epic like the Iliad, has also been used by successive generations since the inception of its composition, as a repository, or rather an encyclopædia, of all kinds of knowledge, legal, philosophical and religious. At the same time, the poem suffered the usual fate of literary works conceived and executed in ancient times, in that it has been altered or amplified in minor details by scribes, scholiasts and editors. The astronomical references, consisting as they do of a line or two each, belong to the minor class of interpolations. An estimate of the epoch when some of these interpolations became possible is all that can be attempted. In particular, the omen connected with the 13 days' fortnight (see 10th and 11th passages quoted above), which was commented on in paragraph 29, page 8 of the text, could not have been conceived earlier than the time when the rules for determining the ending moments of tithis, with reference to the sun's and the moon's anomalies and equations, were in full operation and this could not have been earlier than the 6th century A.D., when the writings of Varāhamihira were published. The other interpolations about the positions of planets may be referred to more or less the same epoch.

3. A pertinent question in regard to these interpolations as well as those in the Rāmāyana is, whether the framers of them intended merely to give utterance to certain astrological combinations of planets supposed to produce good fortune or the reverse, or whether they intended to designate a particular epoch of time as corresponding to the planetary positions. There is no ground for supposing the second alternative and we are left with the first as furnishing the sole motive for the interpolations. The *Paripāḍal* horoscope, which we treated in section (ii) of Chapter V of the text as pure chronology, is not in terms astrological and must, therefore, be regarded as quite an exceptional passage in ancient Indian literature. Of course there is nothing to prevent a chronological interpretation being put upon an astrological combination of planets; but a mere astrologer is apt to be reckless or ignorant in regard to the astronomical possibility of the positions stated by him; and if the positions are in fact astronomically impossible, it must be equally impossible to put a chronological interpretation upon his statements. A very good illustration of this observation is afforded by the ancient commentary on the *Paripāḍal* horoscope itself, where the commentor Parmēlaḷagar treats the references as merely an astrological question, ignoring altogether the astronomical possibility of the positions assigned by the poet to Venus and Mercury when the sun was according to the comentator in Siṁha, whereas the poet, as shown *in extenso* in section (ii) of Chapter V, evidently intended this horoscope as a piece of chronology no less than of astrology.

4. Some of the Mahābhārata references to astronomy afford an even better illustration of reckless astrological statements made without due regard to astronomical possibilities. Certain well-known passages quoted above, especially No. 5 state that Mars was retrograde in Maghā nakshatra at or shortly before the time of the great battle which is supposed by all authorities to have taken place during the month of Mārgaśīra. So far as the author is aware, neither Mr. Vaidya in his "*Mahābhārata, A criticism,*" nor the late Mr. Gopala Ayyar, nor any of the other writers on the subject of Mahābhārata chronology, have adverted to the circumstance that it is not astronomically possible for the planet Mars to retrograde in the Maghā nakshatra about the time of Kārtika Amāvāsyā or for some days later. An examination of Mars' retrograde positions in Table V-B will make this clear. The impossibility appears, also to be recognized in Indian works of astronomy, such as the Tamil *Jyotishaganita Śastram* by *Münāmpannai Krishna jyoshyar*, paragraph II, page 95. In the same passage of the Mahābhārata it is stated that at the same time Venus was in Pūrva Bhādrapada. This also is an impossible position for Venus when the sun is in Kārtika solar month, or Mārgaśīra lunar month. To get over these difficulties, Mr. Vaidya supposes that the positions of Mars and Venus are to be taken in the sense of vedhas or astrological

cross aspects; but the present writer has very little doubt but that whoever framed these positions of Mars and Venus in the Mahābhārata thought that they were possible astronomical positions and was ignorant that the reverse was the case.

5 It remains to notice the capital drawback of these astronomical references in the Mahābhārata, viz., that owing to the fact of their having been introduced by different writers and at different times, the same planet is supposed to have occupied a number of different rāśis, for instance, Mars is in one passage going back from Jyeshtha towards Anurādha; in another, as already stated, he is retrograde in Maghā. Saturn in the first passage is oppressing Rohiṇi and in the second passage Pūrva Phalguni. Jupiter is in one passage near Viśākha nakshatra and in another in Śravaṇa nakshatra. The only consistent series of references appears to be that in the sizth and eighth passages (Bhīshmaparva 3, verses 17 and 27) which place Jupiter and Saturn near Viśākā and an evil planet, possibly Mars, retrograding between Svāti and Chitrā. The idea seems to be that the three chief planets were retrograding at the same time and were, therefore, exercising a very baneful influence. Mars is not mentioned by name in this passage which only refers to "an evil planet," but since in each of the astronomical passages in the Mahābhārata the three principal planets Mars, Jupiter and Saturn are referred to, we may presume that in the sixth passage which we have selected as being self-consistent, Mars is the planet intended by the description "the evil planet." If we look for a date when all these three planets were retrograding in the positions referred to, we shall probably not find any date in Mārgaśira month, but about the forty-first day of the Indian solar year, i.e., about Vaiśākha month, we find a certain number of dates, first 3084 B.C. in which on or about the fortieth day, Mars, Jupiter and Saturn occupied positions corresponding to 179 degrees (Chitra), 200 degrees (Viśākhā) and 203 degrees (Viśākhā) of longitude In 1316 B.C. on the fortieth day of the Indian solar year the planets' positions were 190 degrees (Svāti), 215 degrees (Anurādhā) and 206 degrees (Vaiśākhā). Lastly, in 1079 B.C. their positions were 195 degrees (Svāti), 207 degrees (Viśākhā) and 222 degrees (Anurādhā). In all these positions the planets were retrograde. As we have already remarked, there is absolutely no reason to suppose that either these or any other dates were actually contemplated by those responsible for the interpolation of astronomical references in the Mahābhārata.

6 The date first mentioned, 3084 B.C., might seem to be a plausible date because it is only 18th years distant from the first year of Kaliyuga 3102 B.C. But in all probability the Kaliyuga of Mahābhārata was not the same as the Kaliyuga (18th February 3102 B.C.) which was devised by the astronomers of Varāhamihira's time in the fifth or sixth century A.D. and which was the assumed date when all the planets were in mean longitude 0. We have the Sūrya siddhānta as an authority for the statement (Sūrya siddhānta I—57) that "at the end of the golden age (Tretāyuga) all the planets by their mean motion, excepting, however, their nodes and apsides, are in conjunction in the 0 degree of longitude." What is true of the golden age must be equally true of the beginning of Kaliyuga, because according to the assumptions of Indian astronomy in the various siddhāntas, every planet completes an integral number of revolutions between the beginning of one yuga and the end of the same. Such was the reason why the astronomers of Varāhamihira's time fixed upon the midnight between the 17th and 18th February, 3102 B.C. as the date of 0 Kaliyuga, according to Sūrya-siddhānta, and sun rise on 18th February, 3102 B.C. as 0 Kaliyuga according to the other siddhāntas. Of course these astronomers knew that the Mahābhārata referred to the Kaliyuga as the beginning of a new order of things. But they probably thought that as the date of the Mahābhārata Kaliyuga was left in vacuo, it was open to them to fill it up in any manner they pleased, provided it suited the purposes of astronomical computation. Varāhamihira alone in a well-known passage, which he professes to quote from Garga, appears to have held a definite opinion as to the period of Yudhishtira's reign, but unfortunately the verses in which he states this opinion have been the subject of numerous and divergent interpretations. The apparent meaning is that "Yudhishtira's reign preceded the Śaka era by 2,526 years," that is, that Yudhishtira flourished *circa* A.D. 78 *minus*

2,526 years = 2448 B.C. This figure has been controverted by Mr. Gopala Ayyar, as well as by Mr. Vaidya, but there is one consideration in favour of it. Varāhamihira, or rather his authority, says that the *Sapta Ṛishis* were at that time in Maghā Nakshatra and no body has attempted to discover what this means. The *Sapta Ṛishis* were supposed to spend 100 years in each nakshatra in succession. This is a pure convention, equivalent to a reckoning by centuries, because the ancient astronomers knew very well that the Sapta Ṛishis, i.e., the constellation Ursa Major or Great Bear had no motion of the kind. It is exceedingly probable that the conventional motion of the Sapta Ṛishis through the nakshatras was made to start like the motions of the planets, with the first nakshtra at the date of 0 Kaliyuga. That first nakshatra was in all probability Krittikā and not Aśvinī according to the modern usage. The astronomers of Varāhamihira's time knew that Krittikā was the first nakshatra in vedic times, and in quoting a nakshatra for the Saptarshis in the reign of Yudhishtira, they probably * conformed to the ancient usage, rather than to their own fixation of Aśvinī as the first nakshatra. If so, Maghā would be the eighth nakshatra, beginning from Krittikā ; that is, the entry of the Ṛishis into Maghā nakshatra would mean the beginning of the eighth century reckoned from 0 Kaliyuga, i.e., from 3102 B.C. This takes us to 2402 B.C., which is not very distant from 2448 B.C., the date recorded in Varāhamihira's verse.

" āsan maghāsu munayah śasati prithivīm yudhishthire nripatau shad dvika panchadvyutah śakakālah tasya rājnaśya."

7. A perusal of the chapter in the Bhishma Parva, in which the majority of the astronomical references occur, will show that that chapter teems with prodigies and portents, all of an extraordinary character, and is conceived in the same spirit as the passages in which the Roman historians Livy, Tacitus and Plutarch have recorded similar prodigies as having been the forerunners of great events in Roman history ; and the astronomical details in the Mahābhārata were presumably added by subsequent writers with no other motive than to add astrological terrors to those already conceived by Vyāsa or whoever first assumed that pen-name.

8. It has generally been considered that there were two eclipses before the great battle, one at the time of new moon, and the other at the time of full moon. Such a succession of eclipses, with no other indication of the probable time, is not, however, sufficient for the verification of any date ; because two eclipses, one solar and the next lunar, succeeding each other within a fortnight, is quite an ordinary phenomenon.

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* *Footnote* —This view becomes all the more probable if Varāhamihira did actually quote the verses in question from an ancient writer, in whose time the practice of reckoning the nakshatras from Krittikā, as the first, was still in vogue. We find elsewhere such reminiscences by a later generation of the same tradition regarding the priority of Krittikā among the nakshatras In the Tamil *Manimekhalai* (date probably, seventh or eighth century A.D), the nakshatra in which Buddha was born, Viśākhā, now the 16th among the 27 nakshatras, is referred to as

மீனத்திடைநிலை மீனத்தகவையில்

minattitainilai minattakavayil

i.e., "in that nakshatra which is the middle one of the nakshatras"; in other words, the Tamil author of *Manimekhalai*, who was probably writing in the seventh century A D., long after the astronomers had begun to regard *Aśvinī* as the first nakshatra, alludes to Buddha's nakshatra of birth, Viśākhā, as the 14th or the middle one among the nakshatras, which it could only be, if the reckoning started with Krittikā as the first nakshatra.

APPENDIX (vi).

DATES OF ĀLVĀRS (REVISED).

The Āḷvārs and Ācharyas were Vaishṇavite authors, preachers, reformers, singers, and ascetics who worked either individually or in groups at the epoch of the general Hindu religious revival from seventh century A.D. onwards. The numerous popular accounts of them which pass under the names of *guruppparamparas* (order of succession of religious teachers) *tirumudiadaivu*, etc., are full of dates with all manner of details of Kaliyuga year, cyclic year, solar month and day, vāra, tithi and nakshatra, which at first sight promise a rich harvest to the chronologist Accordingly the author was at one time inclined to take these dates seriously, and he published the results of his investigation in a pamphlet entitled "Dates of Āḷvārs," copies of which he will be glad to furnish to any one interested in research. Even in that pamphlet he was obliged to recognize that the Kaliyuga years furnished in the popular accounts down to, and excluding, the date of Rāmānuja, were fictitious and more or less imaginary, but it seemed to him then that the other details of tithi, vāra and nakshatra were capable of being independently calculated; and such independent calculation yielded results which were apparently in agreement with general critical considerations. The dates and the verification, as set out in the pamphlet, are reproduced in columns 3 and 4 of the table at the end of this paper.

2. Subsequent reflection and further experience with South Indian dates have, however, led the author to a very different conclusion: in fact these Āḷvār dates afford a typical illustration of the Will o' the Wisp nature of Indian chronology when one relies too much on the dates presented in a certain class of compositions, and in this category one may include the numerous spurious plates examined and exposed by Dr. Fleet and Professor Kielhorn in the pages of the *Indian Antiquary* and the *Cholapattayams* published by Mr. V. Rangachari of Madras in the *Journal of the Royal Asiatic Society*.

3. The question, when and by whom were these Āḷvār dates first *announced to the world*, is a most important one, upon the answer to which will mainly depend our verdict as to their genuineness. The *Divya Sūricharita* of Garuḍavāhanapaṇḍita is said to be the oldest extant work on the subject, to which the traditional details of Āḷvār dates have been traced, and the author of that work professes to have been a contemporary of Rāmānuja (12th century A.D.). Now, if the earliest Āḷvārs are shown either by a calendrical examination of their dates, or on general critical considerations, to belong to the 7th or the 8th century A.D., then we have to enquire carefully and establish when and by whom those dates were first *recorded* and by what means they were *handed down* to at least Rāmānuja's time (12th century A.D.).

4. Let us consider first what the dates themselves have to tell us, and then what the critics tell us about them. It will be instructive to deal first with a typical date, say, that of Tiruppāṇāḷvār who was an Āḷvār originally belonging to the caste of pāṇar, a low caste of singing mendicants.

5. We are told in the popular account that Tiruppāṇāḷvār was born in Kaliyuga 342 ("Kaliyuga 120" is a variant), i.e., somewhere about 2800 B.C., in "Durmati" year, in Kārttigai solar month, on pūrnimā or full moon day ("bahula 2," which is two days later than pūrnimā is a variant), under nakshatra "Rohini" and on a Wednesday. The late Mr. T. A. Gopinatha Rao, in a manuscript entitled "*A critical account of the Śrīvaishṇavas*," which, we are glad to note, the University of Madras has undertaken to publish, tells us that Tiruppāṇāḷvār must be placed between Tirumangaiāḷvār and Toṇḍaraḍippoḍiāḷvār, the former of whom was a contemporary of Nandivarman Pallavamalla (A.D. 717–779) and of Dantivarman (A.D. 779–830). There is nothing to prevent our extending the search for Tiruppāṇāḷvār's date, if we please, to centuries earlier than the 7th, but we shall first exhaust the more probable period, i.e., that since the 7th century A.D. Between A.D. 700 and A.D. 1201 there are only nine Durmati years (A.D. 721, 781, 841, 901, 961, 1021, 1081, 1141 and 1201) and we may easily satisfy ourselves from the present *Ephemeris* that the only date corresponding to either of the alternatives for

Tiruppāṇālvār, always excluding the Kaliyuga year from consideration, is A.D. 841, Wednesday 2nd November (= 10th day of Kārttigai solar month), on which day Margaśira śukla 15 or full moon tithi ended at ·90 of the day while Nakshatra "Rohiṇi" began at ·94, ending at 91 next day.

6. There is no date during this period, satisfying the alternative "Durmati Kārttigai solar month, Bahula 2, Rohiṇi, Wednesday" (Wednesday, 25th October, A.D. 1021, satisfies all conditions except Kārttigai month, for it was the 30th day of Tula or Aippaśi month).

7. The next question is, is it probable that the chronicler of Rāmānuja's time (12th century A.D.) had in mind either the A.D. 841 date for Tiruppāṇālvār, or an earlier date, Wednesday, 15th November, A.D. 601, when Mārgasira śu. ·15 and "Rohini" ended respectively at ·87 and ·77, or still earlier dates which may, with some trouble, be proved to correspond to the given details? If he had any of these dates in his mind, he need not have written at random, as he evidently did, "Kaliyuga 120 or 342." In dealing with such dates, we no doubt dismiss the Kaliyuga years readily from consideration, because really it was not usual at any time during what we may call the epigraphical period (i.e., the period down to the 14th century A.D. in which epigraphy is almost our only safe guide in chronology) to quote Kaliyuga years; and of course Kaliyuga 342 or 2800 B.C. is too early for citations of week-days or solar months, apart from the impossibility of any such date having been preserved by record or tradition for 4,000 years from 2,800 B.C. to A.D. 1200.

8. Supposing the date of birth of Tiruppāṇālvār was the earliest we found above, viz., 15 November A.D. 601, and supposing further that the details of vāra, tithi and nakshatra were handed down regularly from that date to that of the 12th century chronicle in which we find them recorded for the first time, then it is possible to assume that the chronicler, not being able to tell in what Durmati the Ālvār was born, fixed on a Durmati 4,020 years before his own time, instead of a Durmati, only 600 years before. If we make this assumption, in which there is nothing intrinsically absurd, then we may make a similar assumption in regard to other Ālvār dates also, and obtain the following dates, as set out in column 3 of the statement below:—

Serial number in table at the end of this paper.	Names of Āḻvārs.	Dates which more or less satisfy critical considerations.	Remarks.
4	Tirumaḻiśai Āḻvār	A.D. 720, 2 January... ...	Mr. Gopinatha Rao assigns this Ālvār to middle of 7th century A.D.
5	Periyāḻvār	A.D. 725, 27 May	According to Mr. Gopinatha Rao, middle 9th century A.D.
6	Āṇḍāḻ	A.D. 776, 25 June	Do. do.
7	Tirumangaiāḻvār	A.D. 776, 31 October ...	Mr. Gopinatha Rao accepts this.
8	Kulaśekharāḻvar	A.D. 767, 12 February ...	First-half of 9th century according to Mr. Gopinatha Rao.
9	Toṇḍaradippoḍiāḻvār	A.D. 787, 11 December ...	Mr. Gopinatha Rao accepts this.
10	Madpurakkaviāḻvār	A.D. 797, 14 April	
11	Nammāḻvār	A.D. 798, 4 May	Do.
12	Nāthamunigaḻ	A.D. 823, 27 May	Last quarter of 9th and major portion of 10th century A.D. (Gopinatha Rao).
13	Uiyakkoṇḍar	A.D. 828, 17 April, or A.D. 848, 23 March.	
14	Tiruppāṇāḻvār	A.D. 601, 15 November, A.D. 841, 2 November.	Most critics would prefer the date in A.D. 601 because the Āḻvārs preceded Āchāryas like Nāthamuni and Uiyakkoṇḍār.
15	Āḻavandar	A.D. 918, 26 June (born). A.D. 1038, 28 April (died).	
16	Maṇakkālnambi	A.D. 929, 25 February (but this was 22 days short of Virodhi Samvat).	Not a single date in any Virodhi Samvat from A.D. 749 to A.D. 1409 suits the given details: the first suitable date is A.D. 1470, 14 February.
17	Periyanambi	A.D. 937, 11 October ...	Either Tithi śu. 5 given in the traditional account is an error for śu. 12 or Mārgaḻi is an error for Tula.
18	Rāmānuja	A.D. 1017, 4 April (born). A.D. 1137-8 (died).	

9. We seem to have got hold of a number of useful dates which also are more or less likely to satisfy the critics; but somehow we feel that we are not so sure of our ground with the early Āḷvārs as we are with Rāmānuja and *his* immediate predecessors; this is because between Rāmānuja and the Āchāryas who immediately preceded him there are a number of chronological links, whereas our date for Tiruppāṇāḷvār for instance depends on a single chronological clue, the *Ephemeris*. Change any of the details of such a date, e.g., cyclic year, vāra, tithi, or nakshatra, and we may have to shift the date itself by hundreds of years. We become diffident as we reflect that for the details of so many dates of the 7th and subsequent centuries we depend, not upon contemporary records, but upon records which could not have come into existence much before the 12th century A.D. Our confidence in the complete accuracy of these details which we have relied on so far, is not strengthened, but rather the reverse, when we find, as we shall do presently, that for the Āchāryas subsequent to Rāmānuja certain minor calendrical details in the traditional account are positively untrustworthy although we are able to supplement them by information obtained from other sources. For instance

Serial number.	Names of Āchāryas.	Calendrical details according to popular account	Defect, error or irregularity.
19	Mudaliyāṇḍan	The calendrical details, are Srīmukha, Chittirai 18, śu. 6, "Punarvasu," Monday or "Prabhava; Chittirai 25, śu. 10, Punarvasu, Monday.	This exact combination does not occur even once between A.D. 700 and A.D. 2000.
20	Kurattāḷvār	Kaliyuga 4181 Pramodhūta, Tai. śu. 5; "Hasta" Sunday. A.D. 1090-91; 12 Jan. A.D. 1091 or A.D. 1030-31, 16 Jan. A.D. 1031.	A combination of śu. 5 with "Hasta" in Tai month is an impossibility. We are obliged to substitute "ba. 5."
21	Anandāḷvār	Kaliyuga 4154, Vijaya, Chittirai, 10 "śu. 15"; "Chitrā," Friday A.D. 1048, 1 April.	If we follow up the other details, then "Vijaya" and K.Y. 4154 must be an error for "Śarvadhāri," and K.Y. 4149.
22-23	Peria Bhattar, Srīrāmpillai, twin sons of Kurattāḷvār.	Kaliyuga 4175; Ānanda; Vaigāsi; śu. 15, "Anurādha" Wednesday, Variant "Subhakrit" A.D. 1063 (=K.Y. 4164, Sabhakrit), Wednesday 14 May.	The correct details are found in a year corresponding, not to Ānanda, or Subhakrit, or K.Y. 4175, but to K.Y. 4164 = Sobhakrit.
24	Maṇavāḷamāmunigaḷ ...	Kaliyuga 4471, Sādharaṇa; Aiypasi, "Mulā," Friday, Thursday, 24 Oct. A.D. 1370.	The correct week-day is Thursday not Friday. We should not have been able to correct the error if we had not been sure of the Kaliyuga and cyclic years, 4471 and Sādharaṇa.

10. The above are not cases purposely picked out from a number, but simply the records of the six immediate followers of Rāmānuja. Everyone of these recorded dates is, as we have just seen, erroneous: and we are able to rectify them merely because we are confident of the accuracy of certain other details included in the same records. In the records of the earlier Āḷvārs we have no such means of correcting errors. Proceeding from the known to the unknown, we reason that we are not justified in pinning our faith absolutely on the details of dates (even after excluding the Kaliyuga years from consideration) which are contained in the popular accounts.

11. The last and most difficult question still remains to be answered, how were the details of birth of so many persons who were all alike *sanyasins*, and who were drawn from different stations in life, *originally ascertained*? The case of the early Āḷvārs is different from that of Rāmānuja, a voluminous writer and a famous teacher and preacher, who died early in the twelfth century A.D., full of years and full of honour, and upon whose death his admirers and followers would be eager to gather up every scrap of information about his early career, in order to satisfy the natural curiosity of their posterity. We may, if we please, assume for the sake of argument that each of the early Āḷvārs may have been as famous in his day as Rāmānuja was in his; but the same stimulus of curiosity could not have existed in the early days of Vaishṇavism as it did in the twelfth century A.D. and supposing it did exist, it could not have been as easy to satisfy it in the case of a dozen different Āḷvārs as it turned out to be in the unique case of Rāmānuja.

The demand for such information would generally be in proportion to the means available for supplying it; and in early times there would be no means at all of supplying information as to the exact day of even a *great* man's birth. If we take the cases of the founders of the world's three greatest religions, we know that the followers of Buddha, Christ and Mahomet were alike actuated by an intense desire to hand down to posterity the essential details of their masters' lives: and as a result of this desire, we have more or less exact information as to the day of death of each of the three founders: but in the case of all three, information as to the days of their birth is utterly lacking (see as to Christ, page 127 supra, paragraph 310, and as to Buddha, paper No. iv on the subject in the present appendix: the day of Muhammad's death was the 7th June, A.D. 632; it is only known that he was either 63 or 65 years of age at the time of his death). In India, at the present time, and for some hundreds of years past every Hindu has, or has had, a recorded horoscope; but this was not the case even in India in the sixth or seventh century A.D., since no horoscope of any person of that time has come down to us, with the possible exception of Śankara's horoscope (see page 122, paragraph 301 supra), but such an exception only proves the general rule. In ancient Rome where every great man found a biographer, the year of birth was usually stated as So-and-So's consulship: but not till we reach the age of parish registers and baptismal records were means forthcoming in Europe even for an industrious biographer to trace the day when a celebrated person first saw the light. In our own day, only royal personages, whose coming into the world is announced through Reuter, have a chance of having the hour of their birth recorded; while it is a privilege of being born in Bharatavarsha (India) that the poorest person there nowadays may claim to have been born so many hours, minutes and seconds after sunrise on a particular day. In the case of the Āḷvārs, apart from the notoriously humble origin of some of them, there were special difficulties in the way of any one wishing to ascertain the day of their birth. They were sanyāśins and a sanyāśin cannot be questioned as to his pūrvāśrama or the time before he assumed the religious garb, as he is supposed not to remember that time any more than his previous birth. The veil of obscurity surrounding the days of birth of these Āḷvārs was, therefore, we may take it, absolutely impenetrable, and we may extend this observation to Rāmānuja himself in whose case the utmost we can concede is that some biographer of his, probably in the twelfth century A.D. may have retrospectively calculated the day of his birth and in so doing allotted to him 120 years as his span of life, the same having been done in the case of Āḷavandār; (other Āḷvārs who had lived in more spacious times had had 200 and 300 years allotted to them by biographers who were not worried with historical considerations such as in the case of Rāmānuja clogged the flight of the imagination).

12. We reach a conclusion which may be seriously disappointing to the majority of readers, but which is the only one that historical criticism will warrant; viz., that when the biography of Rāmānuja began to be composed, public curiosity was equally exercised about the lives of the Ālvārs and the early Āchāryas, and that then and not till then, i.e., not till the twelfth or thirteenth century A.D. were such meagre details as tradition had handed down amplified for the first time into calendrical shape. The aim of the Indian biographer would in such cases be to fill out the calendrical details so as to attain at least a passable standard of verisimilitude. The combination of a tithi, nakshatra and week-day cannot be invented offhand, like "12th February 1895"; and the biographers of the Ālvārs naturally thought that any details taken from contemporary panchāngas would suit previous times also. If this was the method adopted, we should find all the details of the Āḷvār dates in one subsequent period of 60 to 100 years, the period for which panchāngas would ordinarily be available at any time. How far this hypothesis is tenable in the case of the Āḷvars and the earlier Āchāryas, the reader may judge for himself by examining the contents of column 5 of the table at the end of this paper, which is also partially reproduced below, and which gives the years, in the period between A.D. 1130 and A.D. 1260, when the Āḷvār details were repeated, according to the *Ephemeris*. We have, first of all, the year A.D. 1139 the very next year after Rāmānuja's death, when people's minds would naturally be set

thinking about the dates of the early Ālvārs as well; in the *Ephemeris* for this very year A.D. 1139 will be found the somewhat crude details adopted in the traditional account for the first three Āḷvārs, Poygaiāḷvār, Pūdatāḷvār and Peyāḷvār; namely,

Aippāsi śu. 8, "Śravana," Tuesday for the first Āḷvār (3 Oct. 1139)
Do. 9, "Dhanishṭha," Wednesday for the second Āḷvār (4 Oct. 1139)
Do. 10, "Satabhishaj," Thursday for the third Āḷvār (5 Oct. 1139)
all in the cyclic year Siddhārthi (= A.D. 1139-40)

Tirumaḷisaiāḷvār: the date, 4 January A.D. 1200, suits the traditional details better than the eighth century date 2 January A.D. 720; because the former is ba. 1, as required, and the latter is only ba. 2.

Periyāḷvār and Āṇḍāḷ: The date, A.D. 1256, 27 June, suits Āṇḍāḷ better than the eighth century date, A.D. 776, 25 June, because the former was Śu. 4 as stated in the popular account whereas the latter was Śu. 5.

Kulaśēkhara Āḷvār: The date, A.D. 1208, 31 January, is in Prabhava samvat, as stated in the popular account, whereas the eighth century date, 12 February A.D. 767, was in Parābhava samvat.

Madhurakkavi: There are two dates, A.D. 1217, 21 April, and A.D. 1220, 17 April, corresponding to the two samvats, Īśvara and Vikrama appearing as variants in the traditional account, whereas only the Īśvara date can be found in the eighth century 14 April A.D. 797.

Nummāḷvār: Just as there is a date in Bahudhānya A.D. 798, 4 May, there is another in Bahudhānya, A..D 1218, May.

Mudaḷiyāṇḍān: The date, Monday 9 April A.D. 1033 (=Śrīmukha) ignores śu. 6 and "Punarvasu," whereas these details could very well have been suggested in A.D. 1266 (=Kshaya) when śu. 6 and "Punarvasu" joined on Monday 12 April which was 18 Chittirai. Apparently Śrīmukha was the cyclic year in which Mudaliyāṇḍān was born, but the details śu. 6 and Punarvasu were suggested to the biographer by a panchānga of the year A.D. 1266.

Serial No.	Names of Ālvārs.	Details of date given in the popular accounts.	Details of date verified from the Ephemeries so as to suit the conclusions arrived at by historical critics	Details of date furnished by the Ephemeris in confirmation of the hypothesis that the details were copied from contemporary panchāngas in 12 or 13th cent. A.D.	Remarks.
(1)	(2)	(3)	(4)	(5)	(6)
1	Poygaiāḷvār ...	Dvāpara 862,900, Siddārthi, Aippasi, śu. 8, "Śravana," Tuesday.	Siddārthi = A.D. 719. The choice of three successive tithis and week-days indicates the fictitious character of these dates of birth.	In A.D. 1199, śu. 8, 9 and 10 in Aippasi month fell respectively on Wednesday, Thursday and Friday. In A.D. 1139 (= Siddārthi), śu. 8, 9 and 10, and nakshatras Śravana, Dhanishtha and Satabhishaj fell on Tuesday, Wednesday and Thursday, as required in column (2). Curiously A.D. 1139 was the year after Rāmānuja's death. See No. 18 below.	Mr. Gopinatha Rao suggests middle of 7th cent. A.D.
2	Pūdattāḷvār ..	Dvāpara 862,900, Siddārthi, Aippasi, śu. 9, "Dhan." Wednesday.			
3	Peyāḷvār ..	Dvāpara 862,900, Siddārthi, Aippasi, śu. 10, "Satab," Thursday.			
4	Tirumaḷiśai Āḷvar.	Dvāpara 862,900, Siddārthi, Tai, ba. 1, "Magha," Tuesday. Variants: "ba. 10" and "Thursday."	Tuesday, 2nd January A.D. 720, was ba. 2 (not ba. 1) and nakshatra "Magha."	A.D. 1200, Tuesday, 4th, January; nakshatra "Magha" began on Tuesday at ·96 and ba. 1 ended at ·27.	Mr. Gopinatha Rao assigns this Āḷvār also to middle of 7th cent. A.D.

Serial No.	Names of Āḻvārs.	Details of date given in the popular accounts.	Details of date verified from the Ephemeris so as to suit the conclusions arrived at by historical critics.	Details of date furnished by the Ephemeris in confirmation of the hypothesis that the details were copied from contemporary panchāngas in 12th or 13th cent. A.D.	Remarks.
(1)	(2)	(3)	(4)	(5)	(6)
5	Periyāḻvār ...	Kaliyuga 46, "Krōdhana" Āṇi; śu. 11, Svāti," Sunday. Additional information is supplied in another manuscript that he lived 67 years.	Sunday, 27th May, A.D. 725 (=Krōdhana); ·38; ·66.	A.D. 1205, Sunday, 29th May (=4 Āni); *f.d.t.* 47; *f.d.n.* ·76.	According to Mr. Gopinatha Rao Periyāḻvār and Āṇḍāḷ were contemporaries of a certain Māravarman Srīvallabha, mid. 9th cent. A.D.
6	Āṇḍāḷ ...	Kaluyuga 97, "Nala," Āḍi; śu. 4 "Pur Phalg.," Tuesday.	A.D. 776, Tuesday, 25th June; *f.d.t.* ·04; ·47. Though 5th tithi ended at ·04 on Wednesday it was not the 4th that was current on Tuesday, but the 5th which had begun on Monday.	A.D. 1256; Tuesday, 27th June (= 1 Āḍi); ·74; *f.d.n.* ·34.	
7	Tirumaṅgai Āḻvār.	Kaliyuga 397, Nala, Kārttigai, śu. 15, "Kṛittikā." Thursday.	A.D. 776, Thursday, 31st Oct.; ·62; ·75.	A.D. 1196, Thursday, 7th November; ·73; ·61.	
8	Kulaśēkhara Āḻvār	Kaliyuga 27, Māśi, śu. 12, "Punarvasu," Thursday, Prabhava. Variant: "śu. 10".	A.D. 767 (=Parābhava), Thursday, 12th February; *f.d.t.* 27; *f.d.n.*	A.D. 1207-08 (=Prabhava), Thursday, 31st January 1208 (=Māśi) ·54; 72.	
9	Toṇḍaraḍypodi Āḻvār, Kaliyuga 208.	Kaliyuga 208, Prabhava, Mārgaḻi, ba. 14, "Jyeshtha," Tuesday.	A.D. 787-88 (= Prabhava); On Tuesday, " Dec. A.D. 787, Mārgaśira, ba. 13 as well as nakshatra Jyeshtha" commenced, ending next day at ·34 and ·68 respectively.	A.D. 1207-08 (= Prabhava), Tuesday, 18th December 1207; *f.d.t.* ·90; *f.d.n.* ·07.	According to Mr. Gopinatha Rao, this Āḻvār and Tirumaṅgai Āḻvār were co-eval, Tiruppāṇāḻvār being between them: Tirumangai was contemporary with Nandivarman Pallavamalla, A.D. 717—779, and of Dantivarman, A.D. 779—830.
10	Madhurakkavi Āḻvār.	Dvāpara 863, 878; "Īśvara," Chittirai, śu. "Chitra," Friday. Variants: śu. 10 and śu. 14, "Vikrama."	A.D. 797 (=Īśvara), Friday, 14th April; śu. 14 *f.d.t.* ·03; Chitrā ended at ·62.	A.D. 1217 (=Īśvara), Friday, 12 Ap., śu. 14, *f.d.t.* ·22; Chitra ended on Friday at ·57. A.D. 1220 (=Vikrama); Friday, 17th April, śu. 14; *f.d.t.* ·34; ·93.	
11	Nammāḻvār ...	Pramāthi, Vaigāśi 12; śu. 15; "Viśākha," Friday; 43rd day of Kaliyuga. Variant: Bahudhānya, Vaigāśi month, Vasantaṛitu, pourṇami.	A.D. 798. Friday, 4th May.	A.D. 1218-19; Friday 11th May (=11 Vaigāśi); *f.d.t.* ·07; ·11.	Mr. Gopinatha Rao notes that that the date A.D. 798 for Nammāḻvār falls in the reign of Parāntaka Pāṇḍya and before A.D. 908 the date of Chōḻa Āditya.
12	Nāthamunigaḷ ..	Kaliyuga 3224, 3324, etc., Sobhakrit or Subhakrit, Āni, śu. 15, "Anurāḍha," Wednesday. Variant: Āni 1.	A.D. 823 (= Sobhakrit); Wednesday, 27th May (=5 Āni); *f.d.t* ·55; ·16.	A.D. 1182 (= Subhakrit), Wednesday, 19th May (= 25 Vaigāsi, not yet Āni); ·85; ·32.	According to Mr. Gopinatha Rao it is very probable that Nāthamunigal flourished in the last quarter of the 9th and major portion of 10th century
13	Uiyākoṇḍār ...	Kaliyuga 3027 or 3927, Parābhava, Chittirai, śu. 15, "Chitra," Friday Variants: "Pūrṇamāśi" and Kṛittika."	A.D. 828 (Kilaka, 2 years after Parābhava), Friday 17th April; ·99 (ba. ·15 not śu. ·15); nakshatra "Kṛittikā" began at ·97 of the day. A.D. 848 (=Prabhava, not Parābhava), Friday, 23rd March; nakshatra "Chitra" was current throughout Friday and came to end at ·02 on Saturday, A.D. 920 (=Vikrama), Saturday, 22nd April.	A.D. 1186 (=Parābhava), Friday, 4th April (= 11 Chittirai); *f.d.t.*, 70; *f.d.n.* 88. [There was a lunar eclipse next day.]	Details of date have evidently been much altered from manuscript to manuscript.
14	Tiruppāṇāḻvār ...	Kaliyuga 342 (or 120), Durmati, Kārttigai, ba. 2, Rohini, Wednesday. Variant: "Purnima."	A.D. 601, Wednesday, 15th November; ·87; ·77; or A.D. 841, Wednesday, 2nd November (=10 Kārttigai), Margaśira, śu. 15 ended at ·90 and nakshatra "Rohini" began at ·94, ending on Thursday at ·91.	A.D. 1261 (= Durmati), Wednesday, 9th Norember (=13 Kārttigai); ba. 2 began at ·64, ending next day at ·71; "Rohini" ended at 52.	Week-day does not suit A.D. 901, 961, 1021, 1081, 1144, 1201. According to Mr. Gopinatha Rao, this Āḻvār was between Nos. 7 and 9. In 601 there is a date, none in 721, 781.

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(1)	(2)	(3)	(4)	(5)	(6)
15	Āḻavandār ...	Born Kaliyuga 4017, Dhātu, Ādi, śu. 15; Uttarāshāḍha, Friday. Died on 6th Vaigāśi, "Śravaṇa" day; no week-day.	A.D. 918 = (Bahudhānya, not Dhātu Samvat), Friday, 26th June. Date of death, A.D. 1038, Friday, 28th April.	A.D. 1216, Friday, 1st July (=5 Āḍi); ·05; ·48.	According to Mr. Gopinatha Rao, Āḻavandār was born so(on) after Nāthamuni's death.
16	Maṇakkāl Nambi.	Kaliyuga 3970 (or 3900, 3910 or 4030), Virōdhi, Māśi, śu. 14, "Maghā," Wednesday.	A.D. 929-930 (= Virōdhi); Māśi, śu 14 joined with nakshatra "Maghā" on Monday (not Wednesday), 15th February A.D. 930. A.D. 929, February 25th, Wednesday which was 22 short of Virōdhi.	A.D. 1230 (= Virōdhi), Wednesday, 30th January (= 7 Māśi); purnima, not śu. 14 ended at ·31 and "Maghā" at ·81.	No suitable week day in A.D. 740-50, 809-10, 869-70, 989-90, 1049-50, 1109-10, 1169-70, 1289-90, etc. In fact not a single date from 749-50 to 1409-50 suits exactly A.D. 1470, Wednesday 14th, Friday (= 20 Māśi), ·90; f.d.n. 28 alone suits.
17	Periya Nambi ...	Kaliyuga 4098; Hēviḻambi; Mārgaḻi; śu. 5; "Jyeshtha," Wednesday.	A.D 937 (= Hēviḻambi); on Wednesday, 11th October, śu. 4 ended and śu. 5 commenced at ·56 of the day while nakshatra Jyeshtha ended at ·21 on Wednesday. śu. 5 ended next day at 64. The month was Tula, not Mārgaḻi.	In A.D. 1237 (= Hēviḻambi), on Wednesday, 16th December (= 21 Mārgaḻi), "Jyeshtha" commenced at 18, but tithi was śu. 12 not śu. 5.	Tithi śu 5 cannot join with nakshatra Jyeshtha in Mārgaḻi month.
18	Rāmānuja ...	Kaliyuga 4118, Piṅgala, Chittirai 12, śu. 5; "Ārdrā," Thursday. Date of death of Rāmānuja is given by the chronogram Dharmonashta = Śaka 1059 (= A.D. 1137-8).	A D 1017, Thursday, 4th April (= 13 Chittirai); śu. 5 ended at 17 of day and nakshatra "Ardrā" at ·75 of day.	According to Mr. Gopinatha Rao, Rāmānuja when two-thirds of his great work Mahābhāshya was finished escaped from persecution by the Chōḻa king Kulōttuṅga I and sought refuge in the Hoysala country.	
19	Mudaliyāṇḍān ...	Śrīmukha, Chittirai 18; su. 6, "Punarvasu," Monday.	Monday, 9th April, A.D 1033 (= Śrīmukha) was 18 Chittirai but it was not a day of śu. 6 or "Punarvasu."	Chittirai 18, śu. 6, Punarvasu, Monday, is a possible combination but there is no actual example of it in a Śrī mukha year for 1,300 years. One actual instance in another year is A.D. 1266 (= Kshaya); Monday, 12th April (= 18 Chittirai); ·58; ·83. See paragraph 12 of the paper.	According to tradition Mudaliyāṇḍan, the nephew of Rāmānuja, was born when the latter was 16 years of age and day of month's week-day does not suit in 783, 793, 853, 913, 1093, 1153, 1213, 1273, 1333 1393, etc., up to A.D. 1993, śu. 10 can combine with Punarvasu only in Māśi, Panguni, while ba. 10 can concur with Punarvasu only in Āvaṇi.
		Prabhava, Māśi 25; ba. 10, "Punarvasu," Thursday. Prabhava, Chittirai 25, śu. 10, "Punarvasu," Thursday. *Note.*—No Kaliyuga year is quoted.	In A.D 1041 (= Vṛisha), on Thursday 9th April, which was 18 Chittirai, śu. 6 joined with Punarvasu but the cyclic year was Vṛisha not Śrīmukha.	See last column.	
20	Kūrattāḻvār ...	Kaliyuga 4131, Pramōdhūta, Tai, śu. ·5 (obvious error for ba ·5), "Hastā," Sunday. Variants: "Saumya, Tai, Panchami, Hasta," Thursday."	In A.D. 1030-31 (= Pramōdhūta), ba. ·5 and "Hasta" joined on Saturday (not Sunday), 16th January, A.D. 1031. In A.D. 1090-91 (= Pramōdhūta), ba. 5 and "Hasta" joined on Sunday, 12th January, A.D 1091; ·93; f.d.n. ·16.	A.D. 1090-1091 is a calendrically correct year for the birth of Kūrattāḻvār, but according to Mr. Gopinatha Rao, Kūrattāḻvār and Periyanambi had their eyes gouged out by the Chōḻa king Kulōttunga I in Kaliyukti = A.D. 1078-79. Moreover tradition has it that	
			Kūrattāḻvār was 8 years older than Mudaliyāṇḍān. The dates of their birth in column (3), viz., A.D. 1031 January and April 1033, are supported by tradition, though not by the calendrical details furnished by the traditional account. See paragraph 12 of the paper.		

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(1)	(2)	(3)	(4)	(5)	(6)
21	Ānandāḷvār ...	Kaliyuga 4154, Vijaya, Chittirai, 10, śu. 15, "Chitra," Friday.	A.D. 1048-49 (= Sarvadhāri, which is 5 years earlier than Vijaya); Friday, 1st April (= 10 Chittirai); ·63; ·44.	Note error in cyclic year in cases 21, 22 and 23, and see paragraph 12 of the paper. Mr. Gopinatha Rao remarks that Bhattar must have been over 88 at the time of his death, A.D. 1165; that Nanjiyar succeeded him, to be succeeded in turn by Nampiḷḷai or Lokāchārya: the latter's successor was Piḷḷai Lokāchārya, in whose time the Muhammadans invaded the south of India.	
22, 23	Periya Bhattar and Śrīrāmpiḷḷai, twin sons of Kūrattāḷvar.	Kaliyuga 4175, Ānanda, Vaigāśi, śu. 15, "Anurādha," Wednesday. Variant: Subhakrit.	In A.D. 1063 (= Sobhakrit, Kaliyuga 4164), on Wednesday, 14th May, śu. 15 commenced ending next day at ·13, while nakshatra Anurādha came to end at ·85 on Wednesday.		
24	Maṇavāḷamāmunigaḷ.	Kaliyuga 4471, Sadhāraṇa, Aippaśi, "Mulā," Friday.	In A.D. 1370 (= Sādhāraṇa), on Thursday (not Friday), 24th October, śu. 4 and nakshatra "Mūlā" ended both at ·62 of the day.	Note error in week-day and see paragraph 12 of the paper.	

APPENDIX (vii)

THE USE OF CYCLES OF RECURRENCE IN INDIAN CHRONOLOGICAL INVESTIGATION.

[*Paper read before the Second Oriental Conference, Calcutta, 30th January 1922.*]

The most interesting and at the same time the most complicated problems in chronological investigation may arise when we wish to ascertain the exact position of the sun or moon or one or more of the planets on an ancient date or to verify an alleged ancient eclipse. The problem which confronts the chronologist in practice is usually the converse of this. That is, he may have come across an ancient record indicating that the sun or moon or one or more of the planets stood in a particular position or that there was a solar or a lunar eclipse, and he may wish to make use of these astronomical facts to discover, establish or verify an ancient date.

2. The following are instances of such problems :—

(1) Vālmīki's Rāmāyaṇa states that Rāma was born on the 9th tithi of the lunar month Chaitra, when five planets were in exaltation, and these planets are assumed to be the Sun, Mars, Jupiter, Venus and Saturn. The houses of exaltation of these five planets are Mēsha (or Aries , Karkaṭaka (or Cancer), Mīna (or Pisces) and Tula (or Libra). The chronologist may put himself the question ; were these planets at any time in the positions named, on the 9th tithi of Chaitra, and if so when? Whether the casting of such a horoscope was possible at any date which might be assigned on general considerations to Rāma's birth, is a distinct question which the chronologist may have to answer by way of supplementing his answer to the first question. (*Indian Chronology*, Second Edition, pages 109—122).

(2) When Sankara was born, four out of the same five planets, i.e., all excepting Venus, are supposed to have been in exaltation. Nobody doubts but that the casting of a horoscope was possible when Sankara was born but the other question corresponding to that raised by Rāma's horoscope, viz., for what date Sankara's horoscope was true, must be answered by the chronologist. (*Indian Chronology*, Second Edition, pages 109—122.)

(3) Various collocations of the planets are referred to in the Mahābhārata as having been noticed at the time of the great battle in the months of Kārttika-Mārgaśīra: (i) Were these observations possible at any date which could be assigned to the Mahābhārata? (ii) Are these so-called observations consistent with one another? (iii) Was any particular alleged observation, e.g., that about Mars retrograding in Maghā nakshatra in the month of Kārttika, astronomically impossible, and what bearing has this fact on the other observations supposed to have been made at the same time? (iv) Can a definite date be assigned to any of the collocations?

These are a few of the many tantalizing issues raised by the astronomical references in the Mahābhārata. (*Indian Chronology*, Second Edition, Appendix, Paper V.)

(4) An ancient Chinese observation is said to refer to five planets, the Moon, Mars, Mercury, Jupiter and Saturn, which were in the same constellation "Shi" (perhaps Kṛittikā) between 25.0 B.C. and 2400 B.C. Was there such a conjunction? Did it happen more than once during the period in question? And if it happened only once, would that enable us to fix the date? The Chinese civilization is, by all accounts, very ancient, and for aught we know, such an observation may well have been made at the time alleged, and it would be interesting if the chronologist could discover, establish, or verify, the date. (*Indian Chronology*, Second Edition, pages 123–124.)

(5) Coming to times more distinctly modern, an ancient Jewish tradition connected the birth of the Messaiah with a conjunction of Jupiter and Saturn. Was there such a conjunction at any date which could with any probability be assigned to the birth of Christ, and would such a conjunction throw a light on the state of the heavens at the time of the birth of Christ, as narrated in St. Luke's Gospel? (*Indian Chronology*, Second Edition, pages 125—127.)

(6) The Jews in Cochin on the West Coast of the Madras Presidency are in possession of an ancient copper-plate grant which is still shown to visitors at the Jewish synagogue in Cochin, and their belief is that the grant was made by a king of Cochin called Bhaskara Ravi-Varman in the 1st century A.D. The date of the copper plate is the 2nd year opposite the 36th year. This so-called opposition of years is itself a chronological problem. Fortunately within the last few years of the twentieth century A.D., other copper-plate grants by a king or kings bearing the same name Bhaskara Ravi-varman have come to light in a part of the country not far from Cochin and they refer to a position of Jupiter in Tulā rāsi along with other astronomical details. The chronologist may feel disposed to review the Cochin Jews' grant in the light of these positions of Jupiter, and then he may have to relegate it to the 11th or 12th century A.D. (*Indian Ephemeris*, Volume I, Part II, page 120.)

(Travancore Archaeological Series, Vol. II, No. 7.)

(7) Lastly, in the very heart of Tamil Sangam literature, where one would least expect it (if, according to the late Mr. Kanagasabhai Pillai in his *Tamils 1800 years ago* and the present *Dr. S. Krishnaswami Ayyangar* in his *Ancient India*, that literature is stamped with clear reminiscences of the 1st and 2nd centuries A.D.), there is a complete horoscope (see *Paripādal*, Canto XI), giving the positions of Sun, Moon, Mars, Mercury, Jupiter, Venus and Saturn on a particular day which was also a day of Lunar Eclipse early in the morning. Without reference to theories about the time of appearance of the Sangam literature, the chronologist may attempt to locate this horoscope in time. (*Indian Chronology*, Second Edition, pages 98—109.)

3. Solutions of problems (1) to (6) have been presented to the public by various writers, but so far as I am aware, no one has presented a rigorous *method* of solving them such as will satisfy a mathematician and at the same time one which anybody could study and thereafter apply to a criticism of the solutions of different critics, so as to be able in turn to criticize or challenge them. In this century when even the Newtonian law of gravitation has been challenged, it has become incumbent on an author voluntarily to provide what are euphemistically termed *pros* and *cons*, i.e., every facility for the dissection and public criticism of his scientific conclusions. In the Second Edition of "*Indian Chronology*" I have fully stated my method of solving such problems.

4. There is one essential difference between ordinary or civil chronology and those extraordinary chronological investigations with which we are now concerned. The ordinary civil chronology of all nations, except the Hindus, occupies itself with the mean or average movements of the two heavenly bodies which among all peoples and at all times have served as the measures of time, the sun and the moon: in India alone, in the period since about A.D. 500 the actual positions, rather than the mean, of these heavenly bodies as well as of others have to be taken into account. In the exceptional chronological investigations we are now discussing the *actual* positions of the sun, moon and planets are in question, and it is in the determination of *actual* positions, without actual calculation, that we find cycles of recurrence to be of real practical value. In India owing to the peculiarity noted above, the actual positions of the heavenly bodies dealt with, whether sun, moon or the planets, are the normal topic of chronology and the only way of determining those positions, if we wish to keep in the background the details of astronomical calculation which repel even investigators, is by using cycles of recurrence. The very long cycles of 432,000 years and 4,320,000 years which are used in Indian astronomical works are not useful for our purpose, and indeed they are meant for a different purpose altogether.

5. For tithis and nakshatras, for which Indian chronology postulates minute accuracy as regards ending moments, we have to employ quite a number of cycles of recurrence:—

For the mean ending moment of tithis we use successively—

(A) 64 tithis = 63 days — ·001 day.
(B) 703 tithis = 692 days + ·0001 day.
(C) 9,203 tithis = 9,059 days + ·00002 day.

For the moon's tithi equation we use—

(A) 28 tithis = 1 anomalistic month — ·007 day.
(B) 3,779 tithis = 135 anom. months — ·001 day.

For the mean ending moments of nakshatras, we use—

(A) 84 nakshatras = 85 days + ·0008 day.
(B) 1,343 nakshatras = 1,359 days + ·0003 day.

For the moon's nakshatra equation we use —

(A) 354 nakshatras = 13 anomalistic months + ·008 day.
(B) 3,431 nakshatras = 126 anomalistic months + ·003 day.

After 550 years less 19 days, the mean and actual ending moments of nakshatras and the nakshatra equation of every successive nakshatra will be the same; the serial number of each nakshatra being + 4, and week-day + 1.

6. So far as can be perceived, there is no similar cycle connecting the mean ending moment of a tithi and the two equations which, in Indian astronomy, determine its actual ending moment. The cycles defined above enable us, however, to write down, or print, successively for any number of years, the mean ending moments and the two equations of successive tithis; the labour saved in this way enables us to calculate the actual ending moments of successive tithis and nakshatras for ten years in a single day, or for 1,500 years in 150 days, whereas the ordinary Indian panchanga-maker spends not less than a whole month in calculating the tithis of a single year and he spends on the whole three months for preparing a single year's panchanga. (*Indian Ephemeris*, Volume I, Part II, page 2.)

7. In regard to planets, the Indian system enables the chronologist to obtain the actual positions of planets practically for all time with sufficient accuracy for *his* purposes, by using appropriate cycles, but neither the fact that such cycles exist nor the possibility of using them for arriving at the actual positions of planets on any ancient date has, so far as I am aware, been ever brought to public notice, any more than the possibility of calculating by means of appropriate cycles the actual ending moments of tithis and nakshatras for any date past, present or future. It is for this reason that I crave the indulgence of the conference for my present note. As in the case of tithis, the Indian system uses only two equations for determining the actual geocentric place of a planet, and this process gives results which seldom differ from the absolutely correct result by as much as two degrees. The two equations depend, the one on the mean longitude of the planet, and the other on the mean longitude of the sun for the moment in question. (This statement overlooks certain minor details of calculation but it is in the main correct.) By using certain long period cycles for the different planets (363 years for Mars, 355 years for Mercury, 605 years for Jupiter, 235 years for Venus, 383 years for Saturn, and 1,711 years (less two days) for Rāhu or the moon's ascending node), we are able to set down at once without calculation the date when the same planet was in the same position any number of years before the present time.

8. For determining the movements of the several planets during the single cycle, we do not need to calculate the movements of Mars for 363 years, of Mercury for 355 years, of Jupiter for 605 years, of Venus for 235 years, of Saturn for 383 years and of Rāhu for 1,711 years. Each one of these long cycles is connected with certain shorter cycles which have been known for a long time (Mars, 79 years; Mercury, 46 years; Jupiter, 83 years; Venus, 8 years; Saturn, 59 years, and Rāhu, 18 years and 10 days) in such a way that out of each shorter cycle the corresponding longer one may be evolved by a simple arithmetical process. The exact way in which this is done may be best understood from the illustrations given in the Second Edition of *Indian Chronology* (pages 127—131).

9. In addition to the cyclic tables referred to above, we want, for the investigation of horoscopes in which years are omitted, which is the case with all ancient Indian horoscopes, also a table giving in parallel columns for Mars, for Jupiter and Saturn, the increase of mean longitude for one year, for two years, for three years, and so on, up to, say, 2,000 years; and we also want, at any rate for Mars, an eye-table giving for each day of the Indian solar year, or for every ten days, the actual geocentric longitude corresponding to every successive degree of mean longitude. (*Indian Chronology*, Second Edition, Tables IV, V-A and V-B.)

10. Armed with these three tables, we may with confidence approach the solution of any of the planetary problems set out in paragraph 2 supra: the actual solutions of all the problems, or a proof that a solution does not exist, will be found in the Second Edition of *Indian Chronology* and the appendices thereto.

11. We may conclude with a remark about eclipses. The well-known eclipse cycle, called the Saros of 18 years and 10 days, has to be combined for our purposes with another cycle of 58 years less 41 days, after which the sun returns to almost exactly the same position with reference to the moon's ascending node. The combination can be carried on for 1,711 years less two days, after which the whole series is repeated without alteration. For lunar eclipses this cycle gives good results and for solar eclipses certain considerations as to visibility of solar eclipses which are explained in the second edition of my *Indian Chronology* have to be borne in mind.

12. On the general subject of the investigation of ancient dates in India it is well to bear in mind the results of recent historical research in India as well as in Europe:

While Indian literature is undoubtedly ancient, every part of it is not equally ancient. Particularly in the department of Indian astrology, a number of patently modern compositions pass for the works of rishis dating from the dawn of Kaliyuga or earlier. They are simply forgeries in the sense that they profess to be very ancient, whereas they are not, and an astronomical analysis of their contents, which is possible whenever they contain horoscopes, will reveal their absolutely modern character. A circumstance of which astrologers do not seem to be aware, but which the public at any rate is interested in knowing, is that a genuine horoscope containing the positions of five or six planets in rāsis (i.e., in multiples of 30°, without specification of the particular degree), provided the time of year is indicated even in general terms, should enable an investigator working on the lines indicated in *Indian Chronology*, Second Edition, to verify its date in such a manner that the same horoscope would not be applicable to more than one date, at most to two, during a period of several thousand years. This principle may be shortly enunciated as "one horoscope, one date." I would go so far as to throw out a challenge that the entire contents of the collections of horoscopes, known by the name of *grantha nādi* in southern India and by other names elsewhere, can be proved mathematically to be concerned exclusively with the lives of persons born within the last hundred years. Why should the *maharshis* who wrote in the dawn of Kaliyuga have concerned themselves exclusively with people living within the last hundred years from, say, A.D. 1820 to A.D. 1920?

13. I have in my possession a Tamil pamphlet giving Rāma's horoscope in most minute detail, but without the year. I do not enter into the question whence these details were derived, but it does not seem to have occurred to the learned author of the pamphlet that a horoscope with so many details can be referred only to one year, month, day, hour, and minute in a million years, and nevertheless he has made no attempt to find out the year, which would at least have been interesting as a speculation.

14. If we approach the question from the historian's point of view, we find (*Encyclopædia Britannica*, Vol. 2, page 797, Article *Astrology*) that "the theory of the ecliptic does not appear to have been perfected until after 539 B.C. . . . The researches of Bouché-Leclercq, Cumont and Boll have enabled us to fix

1. Bouché Leclercq *L'Astrologie Grecque*, Paris, 1899.

2. Franz Cumont, "*Catalogus codicum astrologorum Graecorum*," Brussels, 1898; 7 parts, published up to 1909.

3. Franz Boll, "*Die Erforschung der antiker Astrologie.*"

4. CH. VIROLLEAUD, "*L'astrologie chaldéenne*," Paris, 1905, to be completed in 8 parts, transliteration and translation of cunei-form texts.

with a considerable degree of definiteness the middle of the fourth century B.C. as the period when Babylonian astrology began its triumphal march to the West, invading the domain of Greek and Roman culture and destined to exercise a strong hold on all nations and groups—more particularly in Egypt—that came within the sphere of Greek and Roman influence." (Astronomy proper was just dawning in Babylonia at the downfall of the Babylonian empire, 539 B.C.) . . . "In the hands of the Greeks and of the later Egyptians astrology and astronomy were carried far beyond the limits attained by the Babylonians" (The Babylonian astrology was confined to inspecting the heavens in order to foretell their influence on kings and public events). . . . "The endeavour to trace the horoscope of the *individual* from the position of the planets and stars at the time of birth (or as was attempted by other astrologers at the time of conception) represents the most significant contribution of the Greeks to astrology."

15. A perusal of the article from which the above passage is extracted will convince any one that the astrology which we find reflected in classical works (Livy, Tacitus, Plutarch, etc.) as well as in Shakespeare's references to celestial prodigies in *Hamlet* and *Julius Cæsar* (reproduced partly from Plutarch and partly perhaps from the contemporary astrological writers of Queen Elizabethan's time, whose name was legion), is the astrology of empires, prognosticating revolutions among mankind, and not the fortunes of private individuals; that the later kind of astrology, called judicial, was probably invented by the Greeks and Chaldeans in the two or three centuries preceding the Christian era, that from Greece it spread to Rome probably within the last 150 years B.C. and that in the first 150 years A.D. it was actively cultivated at Rome as testified to by Juvenal and other writers, and in the Roman Empire, chiefly at Alexandria, becoming associated about 150 A.D. with the illustrious name of Klaudios Ptolemy.

16. An examination on the other hand, of dated early Indian astrological works by Varāhamihira and others (see Dr. *Burgess' Notes* in J.R.A.S., 1893, on *Hindu astronomy and the sources of our knowledge of it*) will convince us that Varāhamihira freely borrowed his astronomical constants, terms and phrases from the Greek writers; and that the true genesis of Indian astrology is from the Greek writers on astrology between A.D. 150 and A.D. 300, so that Varāhamihira is an intellectual descendant of Ptolemy, while astrologers like Garga who were earlier in date than Varāhamihira and whom we know of only by name could not have been more ancient than the Chaldean and Greek astrologers who were the progenitors of judicial astrology. We are confronted also by the fact that the early Indian literature (Sanskrit or Dravidian) before A.D. 300 does not refer to the signs of the zodiac, to the movements of the planets or to planetary horoscopes, which are as it were the tripod of astrology. And we have the valuable indirect evidence furnished by Juvenal that at Rome in the 1st century A.D. when there was a general craze for astrology and divination, Indian professionals were imported into Rome, as *augurs*, not as *astrologers*.

17. The allusions to astrology which are to be found in ancient Indian works, like the Rāmāyana and the Mahābhārata, are as a rule, mere astrological tit-bits introduced or rather interpolated into the text by subsequent copyists, editors or scholiasts. Other ancient Indian works simply ignore planetary astrology, though they refer to good and bad days as determined by the movements of the Sun and the Moon. Where a literary work, like Śudraka's *Mricchakaṭika*, or Subandhu's *Vāsavadatta*, refers to planets, its composition may be safely referred to a date later than the 5th century A.D. The probable dates of these important works, as determined by critics on other data, agree with this presumption.

18. Eclipses are no doubt alluded to in ancient Indian works, but an eclipse, unconnected with any other indication of date, is of as little use for chronological investigation as the references to lunar months and tithis in the Brahmi inscriptions in India of the third and second centuries B.C.

19. As a rule, either a horoscope or an allusion to a week-day is necessary for verifying an Indian date and both horoscopes and week-days (as the writer has shown elsewhere) are in India posterior to 300 A.D.

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